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Purification.—No. II.

[By A. S. B. LITTLE.]

Apart altogether from the future, the ever pressing need for a lighting and heating agent that will give satisfaction calls for the greatest care in every particular during the manufacture and distribution of the present standard makes of coal and water gas. It must always be remembered in this connection that, before many years the supply of 1 per cent. to 2 per cent. sulphur coal will not be very great, owing to exhaustion of the present gas coal fields, and it, therefore, will be a matter of great moment to gas engineers to have a perfect knowledge of modern and inexpensive purification systems. Even now, it is doubtful if coal purchased as so-called low-sulphur gas coal, is in all cases supplied according to expectations, and considering that about 12 million of tons of gas coal were used in the United States during the year 1908, we can well appreciate the possibility of the coal companies being unable to continue the supply of good gas coals.

The average composition of gas coals, as now used in the United States, is of interest, and an extract is, therefore, made from a paper read by W. H. Fulweiler before the American Gas Institute, in October, 1908.[1]

1. A. G. L. J., Vol. 90, 1909, pages 2 and 46.

REFERENCE 8.—*Proximate and Ultimate Analyses of Gas Coals.*

	Pittsburgh, Pa.	Fairmont, W. Va.	Straight Creek, Ky.	Hocking Valley, O.	Hartshorn, Ind Ter.
Moisture	1.07	1.35	1.92	6.72	3 87
Volatile	39.24	36.92	36.56	37.13	35 73
Fixed carbon	50.92	55.36	57.08	50.32	50 05
Ash	8.77	6.37	4.44	5.84	10 35
Carbon	87.42	78.31	78.31	69.42	69 85
Hydrogen	6.01	5.26	5.36	5.35	5 14
Oxygen	6.82	7.61	8.80	16.27	11 38
Nitrogen	1.88	1.55	1.85	1.46	1.29
Sulphur	2.83	.90	1.24	1.67	1 99
Heating value	15,353	14,164	14,319	12,388	12,620

The laws in force in the various States vary a good deal, and, according to the extremely interesting paper prepared and read by Chas. J. Ramsburg, at the American Gas Institute meeting, October 20th, 1909,[1] there are but four States and the District of Columbia where the amount of sulphur compound content is the subject of laws; namely, Wisconsin, Massachusetts, Connecticut and New York. How long this will remain so it is difficult to say.

Most of the laws have been based on the regulations made by the Metropolitan Gas Referees of London, England, and it is, therefore, advisable to give in detail a copy of their report in that section which deals with the tests for sulphurretted hydrogen. This test is a most severe one, although it is simple to carry out, and would, at the first glance, seem to lean favorably to the gas maker in the conclusions he draws from the discoloration of test paper; but the very opposite is the case.

Report as to the Time and Mode of Testing for Sulphuretted Hydrogen.—"The gas as it leaves the service pipe shall be passed through a glass vessel, in which are suspended slips of bibulous paper which have been recently moistened by dipping them in a solution consisting of 100 grains of crystallized acetate of lead dissolved in 100 cubic centimeters of water. One testing shall be made daily. In making the testing, gas shall be turned on to the apparatus, and lit at the burner as soon as the air has been swept out. When the gas has burned for 3 minutes it is to be turned off, and one of the slips of paper is to be compared with another similar slip which has not been exposed to the gas. The gas is to be taken as exhibiting a trace of sulphuretted hydrogen, if the slip of paper which has been exposed to it is unmistakably the darker of the two.

"In this event two of the test slips which have been exposed to the gas shall be placed in a stoppered bottle and kept in the dark at the testing place, and slips shall be sent to the Referees, the controlling authority, the chief gas examiner, and the company, while the comparison slip shall be retained for the use of the chief gas examiner."

According to Chas. J. Ramburg, the delicacy of the commonly used lead paper is almost beyond belief, and a layman observing the discoloration of the paper when brought while in a wet state, into a stream of gas containing one part of sulphur in 1 million, would be convinced that the test indicated a considerable amount of impurities.

It is needful, then, to bear this established fact in mind when considering the value of your purifying system by the acetate of lead test, as practical experience has shown that, when testing a purifier box to discover if same is still operative, the presence of foul gas in the purifier room, formed by the escape from a small leak in the inlet mains, an easily observed change in color of paper has taken place. Before changing any particular purifier box it is well to make a test for total quantity of H_2S, using by preference the Tutwiler iodine and starch burette, as although this is not claimed to be definitely and finally conclusive, it gives a wonderfully accurate comparative

1. A. G. L. J., Vol. 92, 1910, pages 486 and 535.

test. The most necessary things to be observed by the gas engineer in his purifying department are: Purifying boxes of ample capacity; a correct form of grid, preferably of the modified, so-called hurdle pattern; high grade oxide of iron properly mixed and tamped; regulation of temperature in the purifiers, quick and laborless means of loading and emptying the boxes; a system of valves giving thorough change in the travel of the gas through the respective boxes and in different directions through each; and last, but not least, a good revivifying yard of ample area protected by a roof.

Although it is almost impossible to buy oxide of iron, with any degree of accuracy, based on a specification, it is nevertheless useful to know just what amount of impurities are contained in the material. The difficulty lies in the fact that the percentage of iron does not determine the ultimate or immediate value to the gas engineer for purification purposes. If such were the case common red ore, showing as it sometimes does as much as 90 per cent. of iron, would be the ideal thing to use, but most gas men know, from hard earned experience, such red ore is of absolutely no value to them in the purifiers. The activity and durability of the oxide are very much dependent on the chemical analyses, especially in regard to the percentage of water of hydration and organic substances as combined with the ferric oxide. It is not within the province of this publication to deal with the very difficult problem of oxide of iron formation, whether by natural or artificial means. With a view to making the article of most use to the greatest number, we intend to leave out as far as possible such chemical formulas and symbols as are not in the curriculum of the average gas man, giving him only such practical hints as are mostly likely to be of immediate use to him in the practical, everyday work connected with his profession.

In this country, at least until quite recently, most managers were confronted with the difficulty of manufacturing an article which other countries provided for his foreign confrères in a natural state. The raw materials for his process were likewise not always readily available, such as, for instance, a sufficient quantity of proper iron borings of suitable size and quality, clean and free from oil and grease. He was always forced to expend a lot of time on the manufacture of the iron rust, and even under the very best of conditions could not be sure of getting a high grade finished product. When forced by local conditions to purchase a supply of manufactured oxide he could not at any time feel assured the material supplied was as good as his own homemade batches. Given ideal conditions as to time, material, brain and brawn, yard space and weather, he was never sure he had a thoroughly oxidized iron, properly mixed with lightening material. It was in many cases liable to fire when put into the box, causing him endless trouble, annoyance, delay and cost, while material purchased was not infrequently known to fire in the railroad car to the destruction of both car and material.

This article is not an advertisement for any particular natural material, but it is perfectly safe to say that the discovering of oxide in a natural state has not *only* placed a new mineral at the disposal of gas engineers. No, it has done considerably more. Apathy is the worst enemy of any business, and the advent of new arguments and advertisements has certainly aroused great interest; first, in the particular material advertised; and, secondly, in every alterative purifying material. If it is proved conclusively that natural oxide positively decreases risk of accident in-and-around the purifier room, then much good would have been done even if no reduction in cost had been achieved.

What does purification cost? Honestly the writer of this article has been unable to determine. Figures given him vary from .6 cent per 1,000 cubic feet of gas made to the decimal, three oughts, or big, round 0's, and then the paltry and insignificant 6 tacked on the back end = .0006 cent per 1,000.

What is the cost of oxide? Again it must be said correct information is lacking. Figures quoted show a variation of from 5 cents per bushel to 45 cents. Which figure is right? As Yum Yum says in the Mikado Opera, "Bless you; it all depends." What does it depend on? Why, on whether or not you add cost of labor and supervision. When "Grandmother" makes her cake she figures the ingredients cost her nothing as they happen to be around the house. So it is with some gas companies; they figure on having a certain amount of casual labor around which, therefore, costs nothing when put to work on purifying material. Being interested in oxide supply the writer does not feel at liberty to give costs, as it would savor of advertising.

A brief word about purification areas is not out of place. An interesting paper was read recently by Mr. Scott in the "Old Country," and reproduced in the *Gas World* for April 8th, 1911. The discussion was particularly interesting. Newbigging recommends an area based on 0.6 superficial feet per 1,000 cubic feet maximum daily make, with a series of 4 purifiers, 1 always off; on, say, a total superficial area of 2.04 superficial feet for each 1,000 cubic feet made per day (maximum as a basis). Mr. Scott obtained figures from actual practice in Scotland, and out of 63 works only 8 approached this size. His figures show:

	For 63 Works	For 12 Highest.	For 12 Lowest.
(1) Average superficial area per 1,000 maximum daily make ...	4.35	7.22	2.36
(2) Average cubic capacity per 1,000 maximum daily make....	21.2	35.4	11.4
(3) Average cubic capacity per ton of coal used per year.....	1.0	1.65	0.51

This shows average 4.35 square feet, as against 2.4 recommended in Newbigging. Clegg's rule is: 1 foot area per 3,600 cubic feet maximum per diem. Hughes' rule is: 1 square yard of sieve per 1,000 cubic feet maximum make per diem. Remember, 2 or 3 sieves or trays are used in each box with only 18 inches of oxide, so in American practice, with deep layers, the rule would be 1 square yard per 2,000 cubic feet. Look up the text books and you will find over 100 different recommendations by leading authorities, and we cannot say definitely which one is right. There seems to be an opportunity for the Institute to secure data and publish same. I would do it, but gas companies seemingly fear to give information to a manufacturer; or, is it they sometimes cannot give accurate information? There is an old joke in England that when a man finds a trivial thing wrong, such as foreign matter in the soup, or dirty crossings between sidewalks, and in other casee if he thinks of a good thing or desires to pose as a benefactor of mankind, he says, "I will write to the *Times* about it." This is not such a huge joke as it looks. If you were to desire a perfectly frank expression as to the real reason why the gas business does not improve in its manufacturing end like it does in the selling end, I would state, "The American gas maker is afraid to see his name in print." Why? Has he nothing to tell, or does he fear ridicule if he does not dot each i and put the commas in the right place? Let me illustrate the case. When I desire to keep posted on the latest thing in engineering, it is only necessary to look through the correspondence columns of the *Engineering News* or the *Engineering Record*. Can you do the same thing in the gas business? In the "Old Country, "Yes;" in America, "No." Until gas men take an interest in gas matters outside their own plant, and show it by coming into the spotlight of publicity—whether at Institute and Association meetings or through the columns of the JOURNAL—then so long will delay occur in putting our manufacturing end as far above European practice as is at present our selling and industrial departments. Expression of opinion results in "self help," and help to others at the same time.

New Processes.—We have already referred to the Feld system and to others of a like complicated nature. The latest to be drawn to the attention of gas engineers is that of Karl Burkheiser, of Hamburg.

In the process of separating sulphuretted hydrogen from gases by passage over an oxygen-yielding mass, it is known that bog iron ore and analogous artificially prepared compounds of iron and oxygen, act not only in moist state, but more or less efficiently when baked; *i. e.*, after expulsion of the water. It has, however, been ascertained that the mass freed from the water by heating—that is to say, the mass of iron oxide—only possesses adequate capability of reaction when maintained at red heat during the passage of the gases. This is a measure which is not compatible with the requirements of modern practice; the high temperature destroys several valuable products contained in the gases. Moreover, the maintenance at red heat is difficult to effect in the case of the masses used. In general, therefore, the practice has been to use the purifying mass in a moist state, which allows of working at ordinary temperatures. The absorbing capacity of such moist masses is, however, so slight that a large amount of space is required with a very low rate of flow, and this involves very considerable dimensions of the purifying apparatus, more particularly as regards ground area.

This intermediate stage is represented by that modification of hydrated iron oxide, which is produced by gradual expulsion of the moisture and of part of the chemically combined water, until the mass is neither hydrated nor oxide. The hydrated iron oxide undergoes several modifications, sharply differential from each other by the coloring of the mass. The moist bog iron ore heretofore used for the sulphur purification is brown; when wholly dried at about 95° or 100° C., the color is changed to ochre. After partial expulsion of the

chemically combined water, a dark-red modification occurs, differing from the light-red or yellow-red of the oxide from which water has been wholly expelled. The dark-red modification occurs after exposure for some time to temperatures varying, approximately, between 100° and 200°C. The period of exposure to produce this red modification varies according to the temperature employed; that is to say, the time required with a temperature of 100°, for example, is longer than with a temperature of 200°, for example and vice versa. The time is also dependent upon the quantity of water present in the mass, being longer for a large quantity of water than for a small. In fact, the time can only be fixed by experiment for each particular case. A higher temperature than 200° C. is not injurious, if the period of exposure is correspondingly shortened.

The prepared, hydrated iron oxide, obtained by carefully regulated heating of bog iron ore, or of a similar artificially prepared mass, is preferably used in a granular state; if it is in the form of powder, agglomeration to a coarser granular state may be effected by a means of a binding agent, such as cement. By virtue of its nature and qualities, the prepared mass requires no loosening admixture, and in view of its dryness, there is no risk of "caking" and baking to solid mass. The large active surface afforded by the fine distribution and porosity is not masked from the gas by water, and thus rendered partiy ineffective. The rate of flow of the gas through the mass, hitherto usually 7 mm. per second, may be increased to 200 mm. per second, so that the excessive dimensions of the purifying plant are very greatly reduced.

To allow of carrying out the process below 100° C. as is most advantageous, the gases are kept in a superheated state during their passage over the mass; that is to say, they are kept in a state in which they tend to absorb water. For this purpose, the gases may be cooled before entering the purifier and then re-heated, or they may be cooled as far as possible below the temperature at which the conversion is to take place in the purifier, and the restoration of heat is made by heating the purifier itself.

For full particulars of this process reference is made to the British Patent, specification issued on June 8th, 1911.

When preparing this article it was hoped that details would be to hand, and subject to publication, referring to the invention of Mr. Dewey; but this wet purifier process, as protected by him, is now in a most interesting stage, and it is preferred to await final developments before publishing those remarable results obtained during the first year's work on experimental and small practical stages. Sufficient is known to enable us to state the invention is entirely practical, has already demonstrated that it can be worked on a large scale with phenomenal results, and that final success over long periods is only a matter of detail.

Another new process, this being the invention of Mr. H. M. Pabst, of Portland, Oregon, deserves mention. This has for its object the reheating of the gas to break up the sulphur compounds and allow of the removal of part in the forming sulphuretted hydrogen. The process is at work in Portland, Oregon, giving excellent results, and it seems to be a matter of need in most gas works where high sulphur fuel is used. The apparatus resembles a Lowe water gas set, and can be worked at a very reasonable cost.

The time seems ripe for the introduction of a new system of purification. We have drifted along in the rut of large, dry, oxide aud lime purifiers for about 37 years, doing little but change a bolt here and there, reduce cover weights and make the removable parts smaller—also, by raising the boxes and doing away with the water lute. Apart from these small details the process of purification is about where it was 30 years ago. There is such a promising field for a good system, it is surely a matter for wonder that so little attention has been given to the subject in the past.

An awakening of interest has recently been observable, and, like with most other things, there seems to be a coincidence in the working out simultaneously on like lines of new ideas in different countries. What the result will be, if any, it is difficult to anticipate, but owing to the great necessity for improvement and the crudity of modern practice, it is almost a certainty that some cheap and efficient process will be evolved.

While writing this article the report in the British Gas Institute Meeting, in Glasgow, came to hand, and perusal of same shows 10 pages given to summary and leaders wherein no mention is made of purification. The body of paper contains: President's address and reports, 13 pages in which the only reference to purification is in 17 lines dealing with the use of lime at Provan Works, Glasgow. There are then 38 pages on "Verticals," a few on high pressure, fireclay materials, carbonizing, public lighting, until 56 pages away we find 25 lines on purification which are here reproduced.

"With regard to purification, the use of lime has been totally abandoned. In fact, the old lime boxes have already been dismantled. Oxide of iron in the form of bog ore is now safely relied upon. There seems to have been a remarkable tendency of late towards accidents in purifiers, due either to carelessness or too active material. It may be a conservative view, but, considering the small cost of purification, it seems preferable to pay a little more as a kind of insurance premium. The purifiers now in use consist of 4 boxes, 30 feet by 20 feet, by 5 feet deep, 3 being always at work and 1 off."[1]

These were originally fitted with grids in two tiers, giving each box a capacity of 40 tons (2,240 pounds), but now contain hurdle grids with a single depth of material of 3 feet 6 inches, making the holding capacity 50 tons. The cost of these grids amounted to $876.60, and the financial advantages reaped by the change are summed up as follows:

Cost of Purification.—Gas Sold.

Old system, 1909, per 1,000	1.0 cent.
New system, 1910, per 1,000	0.6 "
Average of 73 works, 1910, per 1,000	0.8 "

Now, there were 340 high-class, full-pledged gas engineers there as well as 75 visitors (including our own Henry L. Doherty, as the only one from across the ocean), and that report was the best forthcoming on purification. Mr. Bernard Browne, writing on "Aspects of Gas Supply in a South American City," had 2 lines on purification and less than two on the tip-bucket he uses for filling the "Sunk" Purifiers.

It can be said without fear of contradiction that we know less about purification of gas than of any other of the mechanical or chemical processes in a gas plant, and yet here is the most important foreign institute meeting passing with practically no reference and in fact no discussion on this subject. Will the tale at St. Louis be the same when our own institute meets. Are we to listen again to descriptions of main laying under the muddy river, and other subjects not of general interest? We hope for better things as the Institute has a man at the head of the literary department who usually "does things." It is no secret that he is actively interested in a new process himself, so we hope (if his modesty permits) some mention will be made of scientific purification of gas. The main points that require investigation are: What temperature is best in the gas passing through the purifiers? It has always been thought that 90° F. was most suitable, but actual tests show the temperature is not very particular after the material has once "taken hold."

"What effect has ammonia on oxide?" This is something that will bear a lot investigation. Gas engineers, when ready to reverse valves and take a box off, should try by-passing scrubber for about 2 hours. This, to my knowledge, will somewhat astonish you.

Allied with purification is the amount of heat carried in the retorts. The present day large charges and long runs in retorts have upset many plants, as the amount of H_2S is considerably increased when coke is left long in retort. The coke is improved too, of course.

Very few people are aware that the air allowed to enter with the gas should be varied in amount at stated times. Some interesting figures were given me in this connection concerning experiments at Delray-Detroit, but it is well known same were not given for publication. The Detroit City Gas Company should submit same to the JOURNAL in the interest of the gas trade.

[OFFICIAL REPORT—FURNISHED BY THE SECRETARY—CONTINUED FROM PAGE 12.]

PROCEEDINGS, THIRD ANNUAL CONVENTION, PENNSYLVANIA GAS ASSOCIATION.

HELD AT READING, PA., APRIL 12, 13 AND 14, 1911.

THIRD DAY—MORNING SESSION.

Discussion on the Anderson Paper.

The President—Gentlemen, the paper is before you. Mr. Dutton, who was to open the discussion, is not with us, but anyone here who desires to speak thereon we will be glad to hear from. Un-

1. You built the 8 benches of through inclined sizes there in 1894; capacity, about 700 cubic feet per day, and no water gas is made.

fortunately there are few here. I imagine, who are conducting both companies. Mr. Ganser happens to conduct both kinds of companies; in fact, he manages three companies—gas, electricity and steam—an unusual combination.

Mr. Ganser—I believe what Mr. Anderson says, that with companies noncompetitive the business is largely selective; in other words, there is a place for both. Particular care should be taken, however, in training solicitors not to disturb good business already in hand, although we believe in giving people what they wish. If their desire is for electricity, of course we co-operate with them, giving them all assistance possible, even to figuring illumination and laying out jobs for contractors. We have not experienced any great difficulties up to date in losing any good gas consumers. Our representatives understand, if we do lose a good gas consumer it is a case of hustle to try to make it up on the other end. We are introducing some new features in the electric end of our business which are appealing very strongly to the people, and among business houses we have lost some few consumers. I am rather inexperienced in the electric end of the business as conducting the two companies and, of course, I cannot give you very much information along those lines.

The President—Does anyone else desire to comment on this paper?

Mr. Rhoades—The paper is too good a one to go without some discussion. Before going to Williamsport in our Western plants we had all the different departments—hot water, steam, electricity and gas—and made a rule with our solicitors that the gas man, if he came on the trail of a good gas consumer, went right after him as hard as he could; but if he could not land him before letting the gasoline man get him, he turned it over to the electric man, who would go after it as hard as he could. Although at times there was some rivalry, where the gas solicitor thought he ought to be given certain districts, where we thought he ought not to be, it nevertheless worked out very satisfactorily. I think where one has both companies the city might be divided into districts. For instance, where you have a chance to get a very slight electric load for lighting or power, or anything of that sort, and can carry it more economically than you can a gas load, the gas man should be told to keep watch that no gasoline or outside competitors get in, but it is understood that the prospect is practically electrical. In like way there are possibly certain districts where you have no mains or no wires, which is exceptionally good for gas lighting. In such cases the electrical man might be told to leave it alone as long as he could.

Mr. Bains—Mr. Anderson has covered this subject so thoroughly that there is little to say, save in last paragraph, which he mentions as debatable, over the question about the solicitors. I do not see any good reason why a solicitor cannot be trained to sell electricity as well as gas. The solicitor going to the house would size up the conditions, of course, being trained in that line before he goes to the house; and if he sees that it should be an electrical installation there is no reason why he should not sell electricity instead of saying, "I am the gas man. The electrical man should come here, so I will send him around." I think one solicitor can handle both ends, and if the situation is large enough, very likely there should be an expert in the electric end to handle work that is more or less above the man trained in the gas end. Undoubtedly in most cases one man can handle both classes of work.

Mr. Anderson—I am very glad Mr. Bains spoke on that point; in fact, I was, when he arose, going to ask that that particular point should be debated. Having had a number of arguments with men in reference to it I would like to hear this morning considerable said on it. My idea is that when a man goes to a house, being not particularly attached to the gas end or the electrical end, or may be what you call a combination man, he might choose either the gas or electric line of argument when the mind of the prospect was prepared for the opposite argument. The question to me is whether it would not have a bad effect, not only on the prospect but on the solicitor himself, when he finds those conditions, to say, "Oh, well, I will sell you the other then," rather than be disinterested to make that impression on the prospect and feel it himself, which must affect him in the work and cause him to be less wholehearted on it. I would like to hear more said on that particular point.

Mr. Murdock—I would like to ask, in the case of solicitors who go into houses in the summer, if the question ever comes up with them as to the efficiency, etc. of burners, gas burners over electric, or electric over gas, whether that would not effect it? To meet it would seem rather a complicated question for a man to answer.

Mr. Ganser—I would like to say, in answer to Mr. Murdock's question (I expect Mr. Anderson will answer it also) that in a case of such character you tell them exactly the efficiency and consumption of each, and whichever way they show the most inclination to talk after that on those lines. The question was asked me a few weeks ago, "Which does it cost the most to operate, a gas iron or an electric iron?" We are very anxious to sell more electric irons, but I said the gas iron. He said, How much an hour?" He asked me this question, "How much will the electric iron consume?" "Well," I said, "They say 3 cents; possibly 4½." He took the electric iron.

Mr. Gillingham—I worked in a combination company for some years, although I was strictly on the gas end. However, I handled the gas solicitors for a time where our department of new business was separated, one for gas and one for electric. This, I believe, is all right in starting in on a vigorous campaign where the interest is new; but after a little time, when things became settled, the work could be better handled, I believe, by one department; but I am in favor of having two sets of solicitors, one for gas, one for electric. Those boys working in the same company get acquainted with the methods of the other departments, and if they are properly handled by their new business manager, who is purely a safety valve on the job, they will readily size up the customer when they get there. But being gas and electric solicitors, they are more enthusiastic in their own particular subject. They know it better. It is easier to break them into their subject, and when they find a prospect, if it is along the gas line, he works it for all it is worth. He usually makes a good gas consumer of him. But if it is an electric line with cars, and electric lighting in the house or store of his neighbor on the same street, who may be using electricity, he finds his place dark and there is an opportunity for the electric man. He gets in that field and before long he has that store bright, using electricity, The whole business is that the town as a whole develops along both lines; whereas, if one man solicits gas and another electric light, I am inclined to think he would go after it in more half-hearted way, and that the results might be a slight improvement along either line, but not to the extent of making a show from the work that he has done. So I believe, where the interests are one company, if the solicitors are separate, working along their own particular lines, that the friction between the two departments would be kept to a minimum by reason of the new business manager's methods, but along that same line of work that more results will be accomplished. Even if there be a little friction, the company, I believe, is better off in the long run. It might lose some gas consumers to the electric department, or *vice versa*. But taking a year's business the output of both increases, by the fact that one consumer lost either way is only a minor circumstance which leads to larger things.

Mr. Gotwals—Much depends on the previous training of your solicitor. For instance, when employing a new solicitor who was formerly a gas solicitor, and you put him on the gas work, he is going to push the gas, provided he was a good gas solicitor. I know by experience, for I have been in gas and nothing but gas, and but one company's end of it, and find it would be very difficult for me to switch to both. Naturally being enthusiastic on the gas end, I believe the gas field is the one in which to work in. I believe that would depend greatly on the successful training of the man.

Mr. Thomson—I agree with Mr. Bains that, there should be combination men only for special work; but the straight soliciting, store-to-store and house-to-house, should be done by one man, providing he is thoroughly trained, for the simple reason that you have one manager for both departments. His duty is just as much to the salesman as it is to the representative going from door-to-door. If he cannot work both departments together, then have two managers. But if he can and is doing it, for the same reason should the representative work both departments. I believe they can do it if you properly train them, and I certainly feel that the customers would get a wrong impression by having two men. Of course, there is a limit to what this one man can do, but he can go out and work for it on service work; that is, building up the service, and the revenue of your present customers, which can be done by going from door-to-door, taking up both the gas and electric questions. That man certainly should be able to increase the sales; for instance, if it is on combination fixtures, increase the sales of gas and electric service by bettering both. He should be able to put in electricity for irons and toasters, and electric vacuum cleaners and such installations, and should he come up against a proposition where there is not electric service, and there is a chance that this man is talking about electric irons, vacuum cleaners and such things. Now, here is a chance that he has not ever been told of the different ways of using it. It is not

the man's place, he should not hold back and not offer to estimate on the job. It is very easy for him to have some one make that estimate for him, then he can return and close the contract. It can be done, and not only can you get better results, but you certainly will operate your department more economically by having one department with a leader in both departments. You have a leader in the gas department, some one to take care of the industrial end, the factory line and the fitting proposition, and you can have the same thing in the electric end, the straight canvassing to be done by one man, but he must be thoroughly trained. You cannot expect him to start out with 3 or 4 days' training. You have to keep him in and talk to him just the same as your Directors get you in and talk over a proposition. You must get that man to talk over a proposition. I feel the commercial man or financial business manager, or whoever else he may be, certainly should be out on the job and not at the desk. I surely feel you can get much better results by that man out on the job. There is where he belongs, not behind the desk doing clerical details. He should have a clerk to furnish him all the details und information, etc., but get right out in the morning with the boys, mixing with them to see what is being done and he will get better results. [Applause.]

The President—Is there anything else from any other member? If not, we will have Mr. Anderson close the discussion.

Mr. Anderson—I realize this particular part of the question is one which might be debated for a very long time without a decision having been arrived at in the minds of all. To answer what has been said in a general way, particularly Mr. Murdock's suggestion in the way of representatives taking efficiency, I still believe the man who has specialized on their gas or the electric end, and thereby has a firm belief in the efficiency of the appliance used by his own department, can talk more impressiveily concerning it; and if a man is attempting a part of the town whare it has been determined that the gas business is preferable, or in a particular house where added gas business is preferable to electric lighting, particularly what Mr. Ganser said as to the question of the relative cost of the gas irons or one particular appliance, I believe that the solicitors should be instructed, as ours are, to answer a straight question truthfully. A man who answers a question truthfully does not have to keep too many things in his memory, and not hamper him in his future work. So I think the man who started out, say on this case in one part of the town we want to increase the gas business, he is asked a straight question of a kind which might cause him to answer in a way which will be against his previous argument, it must react on him and tend to make him lose courage in obtaining that business, and the business obtained will not thereby be as great as it would be otherwise. I say there is very little to be arrived at by further discussion. That is my feeling. I say, of course, that we divide it up.

On motion a vote of thanks was tendered to Mr. Anderson for his most interesting paper.

The President—Gentlemen, we are at the end of the program. Before adjouring finally I desire to say that it has given me great pleasure to preside over the deliberations of this body of men. I am a firm believer in small associations; not that the large ones have not their uses, as a matter of course; but a small Association, such as we have in Pennsylvania; and personally I feel proud of it as having been one of the first charter members, so-called. I feel proud of this small Association, and if you will leave Reading the better for having attended it, as I know I will feel for having had the pleasure of having you here, then there will be a mutual feeling of pleasure, not only as to the good that we have obtained out of these meetings this week, but the close and social feeling which we have had during the week.

Vote of Thanks.

Mr. Gillingham—Gentlemen, if there is no other business before the Association I believe it is fitting that we extend a vote of thanks to our worthy President, Mr. Keppelman, to the Entertainment Committee, to the Mayor of Reading, his associates and people here who have entertained us most generously. We have all had a most enjoyable meeting. Believing this is due to their efforts, it is in order for the Association to give a standing vote of thanks to them for all that has been done for us at this meeting.

Mr. Butterworth assumed the Chair.

Mr. Rhoades—I second the motion just made. We, as the Pennsylvania Gas Association, have had another of the meetings that we know we are always going to have whenever we meet; that is, the best ever. But for the past three years this has been going right up the ascending scale. Good the first year; a little better the second; a little better the third, and so on right along. To allow a motion to go, simply stating that we are indebted to Reading for the most enjoyable time, I think is allowing it to pass with too few words. What I may add will only emphasize what has already been stated. Certainly we should extend a most heartfelt vote of thanks to Mr. Keppelman and the other gentlemen who assisted him in making this meeting such a success, for obtaining the entertainment for us, which has been both profitable and pleasureable. The trip through the pipe mills was certainty one of the most entertaining features of the very entertaining automobile ride. There we learned to pick out some of the points that are very vital to our interests, as to whether our pipe was being put together right; and we know just exactly how it is being done. If there are flaws in it we know what we are talking about when we pick the flaws. Those things have been an educational feature. The locomotive shops were interesting. We found here types of the very highest mechanical ingenuity that you find in any part of the country, both in the way of handling large machinery and the installation of very fine working machinery for the advancement of the work in the most economical manner; and we certainly should have learned one point from our visit there: That economy and neatness go hand in hand. I wish to call attention to one particular feature that I think was passed over at our banquet last evening. We gave a very hearty vote of thanks to Mr. Jones for the speech that he made us, and still the character of that speech and the learned manner in which it was given deserve a more open statement from the Association. He touched upon points, and in the most logical manner has shown how we as gas men have a right to stand on certain legislation that is coming up. It came from the mind of a lawyer and was also given in words that were not at all equivocal. Anybody could comprehend that the matter referred to was against us, pure and simple, without reason. Mr. Keppelman asked me at one time whether we thought the few features of vaudeville would be acceptable to this Association. We do not have to ask Mr. Keppelman whether that was a pleasurable entertainment. It certainly was, and we feel called upon to congratulate you and your helpers in providing us with such a good and splendid entertainment as was given at that time. I therefore, second the motion that was made that we give a standing assent to our vote of thanks.

The Chairman—Gentlemen, you have heard the motion. Are you ready for the question?

Mr. Anderson—Before putting that, I know that Mr. Rhoades and Mr. Gillingham will consent to this amendment to their motion, that the vote of thanks should be extended to include the gentlemen who provided the automobile ride yesterday.

Mr. Rhoades—I certainly will accept it. I want to add one other thing, possibly not generally known. I want to return our heartfelt thanks to Mr. Keppelman for one very enjoyable feature of the banquet last night, which I believe was distinctly due to his hospitality.

The Chairman—All in favor will please rise. [Unanimously adopted.]

The President—Of course, gentlemen, there is nothing to say in reply to this. If you are satisfied with the treatment you received in Reading, that is enough. Reading is known for its hospitality the world over. Anybody who has had anything to do in Reading is always well received. The latchstring is always out to everybody, and you will find the people of Reading on all occasions equal to anything they are called upon to do. As I said before prior to adjournment, if we go home satisfied with two things—first, that you have learned something (and that is the primary object in coming here); and, second, if you have been entertained properly and in order, then we are entirely satisfied. Now, gentlemen, without further ceremony, I declare this meeting adjourned, *sine die*.

Proceedings, Furnished by the Secretary.—Continued from page 14.

SEVENTH ANNUAL MEETING, IOWA DISTRICT GAS ASSOCIATION.

Held in Lafayette Inn, Clinton, Ia., May 24 and 25.

First Day—Afternoon Session.

President Burt called the meeting to order and introduced Mr. J. H. Warnick, of Omaha, Neb., who read the following paper on

COKES AND OILS FOR WATER GAS MANUFACTURING.

Mr. President and Fellow Members: When the subject of "Cokes and Oils for Water Gas Manufacturing" was assigned, it seemed to

me that, in order to make the paper of any value, it should be presented as a study of the data and experience of older men in the gas fraternity. By collecting the information contributed by men who had made a considerable longer study of the queston, the paper would mean more than if the results of a very small experience were given.

Mr. W. H. Fulwieler, in his paper as printed in the AMERICAN GAS LIGHT JOURNAL, for June 14, 1909, page 1073, very ably discussed the constituents and properties to be considered in chosing a good gas coke. Accordingly we will endeavor to study the materials that represent the backbone of water gas manufacturing as follows:

1st. The constituents and properties to be considered in chosing a good gas coke, and the bearing of the properties when considered, to give a minimum cost and the best machine results.
2d. The sources of supply.
3d. Oils available for water gas manufacture.

In chosing a good gas coke, one should bear in mind the following percentages; First, of fixed and volatile carbon; second, of composition of the ash; third, of moisture; fourth, of sulphur; fifth, size of the coke and physical properties with reference to handling.

Percentage of Fixed and Volatile Carbon.—Primarily, generator fuel is used as a source of carbon; therefore, its value depends on the amount of fixed carbon obtained for a minimum cost, other things being equal. In classifying generator fuel the ratio of the fixed carbon to the volatile has been used as a basis. The best generator fuel has from 21 to 32 times as much fixed carbon as volatile carbon.

Percentage and Composition of the Ash.—The ash is detrimental in two ways: First, it replaces carbon; second, it necessitates more frequent cleaning and consequent loss in capacity on the machine.

Theoretically, 1 per cent. of ash is equivalent to 2 per cent. carbon in waste, and the composition of the ash is very important from the standpoint of operation. The gas maker should aim to get an ash with a high fusing point, for if the fusing point is too low, the ash will run down over the grate bars and form so-called "icicles," hindering the cleaning of the fires and increasing the manufacturing labor cost. There is also danger of the molten ash coming in contact with the iron parts around the firedoors and fusing the grate bars, causing them to melt away, thus necessitating more repairs on the machine.

The best analysis of ash shows about equal proportions of silica and alumina, a minimum amount of calcium and the lowest possible percentage of iron, magnesia and alkalies. An undesirable ash analysis would show silica to the extent of about 30 per cent., iron above 15 per cent., calcium above 10 per cent., and alkalies and magnesia above 3 per cent. Iron is the usual flux appearing in the ash which tends to reduce the fusing point. A comparison of good, fair and bad analyses of ash would read as follows:

Constituents.	Good per Cent.	Fair, per Cent.	Bad, per Cent.
Silica (SiO_2)	54.67	46.23	46.40
Alumina (Al_2O_3)	41.95	31.93	16.45
Iron oxide (FeO)	trace	14.54	18.15
Lime (CaO)	1.82	5.04	11.80
Magnesia (MgO)	1.46	2.26	4.63

Percentage of Moisture.—Moisture is often a big factor in accounting for the discrepancies between the weight shipped and weights as charged to the generators. Some coke has been received with as high as 12 to 14 per cent. moisture. After being stored for some time, the moisture usually decreases to about 4 der cent., or less when charged to the generators.

Percentage of Sulphur.—Sulphur is detrimental, as it must be removed, and consequently influences the purification results. About one-half of the sulphur is volatile and the other half goes into the gas. The best analysis should not show over 1.1 per cent.

Size of the Coke and Physical Properties with Reference to Handling.—The size of the coke has an influence on the amount of acid in the gas, and consequently candle power efficiencies. The amount of breeze caused by handling, due to the physical properties of the coke, is important, as there is always a certain amount of loss due to breeze. Of course, breeze can be utilized in various ways by burning under the boilers or making into briquettes, using the same in the machines, if the works has a briquetting plant installed. However, there is always a depreciation in value, due to breeze, and this should be a minimum.

Sources of Supply.—Below are some anylses which would indicate what we could expect from the various sources of supply:

Pocahontas Coke from Bluefield, W. Va.—Average of Sixteen Analyses.

Constituents.	Per Cent.
Moisture	.40
Volatile combustion	2.76
Fixed carbon	89.70
Ash	7.14
Sulphur	.70
Color ash	Dark terra cotta.

Connelsville Coke from Connelsville, Pa.—One Analysis.

Constituents.	Per Cent.
Moisture	.18
Volatile combustion	1.64
Fixed carbon	90.54
Ash	7.64
Sulphur	.59
Color ash	Terra cotta.

Cokesdale Coke from Kansas Coal.—Average of Two Analyses.

Constituents.	Per Cent.
Moisture	.65
Volatile combustion	4.70
Fixed carbon	73.61
Ash	21.04
Sulphur	3.40
Color ash	Reddish brown.

Coke from Chaffin Coal Co., West Virginia.—Average of Three Analyses.

Constituents.	Per Cent.
Moisture	1.08
Volatile combustion	3.17
Fixed carbon	83.34
Ash	12.41
Sulphur	1.45
Color ash	Terra cotta.

Coke from St. Bernard Mining Co., Earlington, Ky.—Average of Ten Cars.

Constituents.	Per Cent.
Moisture	.59
Volatile combustion	4.64
Fixed carbon	69.80
Ash	24.97
Sulphur	2.42
Color ash	Reddish brown.

Gas House Coke Made from Pennsylvania Coal.—One Analysis.

Constituents.	Per Cent.
Moisture	1.56
Volatile combustion	5.49
Fixed carbon	81.39
Ash	11.58
Sulphur	1.09
Color ash	Reddish gray.

Trinidad Coke from Trinidad, Col.—One Analysis.

Constituents.	Per Cent.
Moisture	.98
Volatile combustion	5.65
Fixed carbon	70.97
Ash	22.40
Sulphur	.5
Color ash	Terra cotta.

Cardiff Coke from Cardiff, Col.—One Analysis.

Constituents.	Per Cent.
Moisture	2.29
Volatile combustion	5.06
Fixed carbon	61.38
Ash	31.27
Sulphur	2.92
Color ash	Reddish brown.

Block Coke from Wyoming.—Average of Two Analyses.

Constituents.	Per Cent.
Moisture	2.38
Volatile combustion	4.78
Fixed carbon	63.39
Ash	29.45
Sulphur	3.78
Color ash	Reddish brown.

Solvay Coke made in Milwaukee.—Average of Thirty-One Analyses.

Constituents.	Per Cent.
Moisture	1.63
Volatile combustion	2.65
Fixed carbon	85.76
Ash	9.96
Sulphur	.87
Color ash	Terra cotta.

Petroleum Coke.—One Analysis.

Constituents.	Per Cent.
Moisture	1.59
Volatile combustion	5.97
Fixed carbon	92.40
Ash	.05
Sulphur	.97
Color ash	Dark violet brown.

From these, one can readily see that the best cokes come from the fields of West Virginia and Pennsylvania. Summing it up, the gas maker must use the coke that would give him the best results for a minimum cost, considering everything that tends to produced a minimum cost of the gas in the holder.

Oils Available for Water Gas Manufacturing.—Mr. J. L. F. Cheetman, in his paper in the AMERICAN GAS LIGHT JOURNAL, Sept. 20, 1909, page 725, shows very clearly the oils available in the United States.

Practically all gas oils contain paraffines and benzines. Broadly speaking, the larger the percentage of paraffines, the better the oil for water gas manufacturing. Benzines are the oils distilled off from 302° to 572° F., and paraffines are the oils distilled from 572° to 700° F. Sulphur is a detriment and should be a minimum.

Quoting from Mr. Cheetman, the "Ultimate Analysis of United States Gas Oils, and Proportion of Paraffine and Benzene Series Contained" are as follows:

Ultimate Analyses—Appalachian Field.

	Cumberland W. Va.	Pennsylvania Crude.	Pennsylvania Crude.	Pennsylvania.
Specific gravity	....	0.830	0.886	0.83
C	86.316	85.51	84.90	86.10
H_2	13.071	14.18	13.70	13.90
O_2	....	....	1.40	....
N_2	0.230	trace	....	....
S_2	....	trace	....	0.06
Authority	Peckman	Mayberry	Urquhart	....

Ohio and Indiana Field.

	Ohio.	Lima.	Ohio.	Walker Ohio.
Specific gravity	..	0.831	....	0.8367
C	84.57	80.20	86.316	85.46
H_2	13.62	17.10	13.071	13.91
O_2	....	2.70	....	....
N_2	....	....	0.230	....
S_2	0.60	....	....	0.48
Authority	Mayberry	W.S.Collins	Perkman	Palmer

California Field.

	Santa Barba Co.	Fresno Co	Kern River.	Santa Clara.
Specific gravity	0.9845	0.8423	0 962	0.8515
C	86.32	86.24	84.43	86.08
H_2	11.70	13.08	10.99	12.88
O_2	....	....	3.34	....
N_2	1.25	....	0.65	....
S_2	0.84	6.21	0.59	0.92
Authority	Mayberry	Mayberry	U.S.Gov.	O'Neil

Texas Field.

	Beaumont.	Beaumont.	Sour Lake.
Specific gravity	0.924	0.912 to 0.914	....
C	84.60	85.03	85.96
H_2	10.90	12.30	13.97
O_2	2.87	....	....
N_2	....	0.92	....
S_2	1.63	1.75	....
Authority	U.S.Gov.	C. Richardson	

The paraffines and benzines exist to a more or less extent in all the oils of the country, except those from California. As all the compounds have never been separated out the actual percentage is not known. The petroleum of the Appalachian field consist chiefly of the paraffine series with some benzines.

The oils of the Ohio and Indiana fields are principally of the paraffine series also, but to a lesser extent than those of the Appalachian field, and contain more of the benzol series.

California oil consists chiefly of benzols with no paraffines.

Texas oils are made up largely on the CnH_2n-2, and CnH_2n-4 series, with but little of the paraffine or benzol series.

The oils from Kansas differ widely in composition from those of any other section. The very light oils are composed to a great extent of members of the paraffine series; the heavy oils, however, contain but a small percentage of these. The Louisiana field is similar to the Texas field, and consists principally of hydrocarbons of the CnH_2n-2 and CnH_2n-4 series.

Mr. R. H. Redding, in his paper[1] in "Progressive Age," June 1, 1909, page 435, has shown the oils available for southern gas manufacture. These are summarized below:

1. A. G. L. J., Vol. 90, 1909, page 686.

WELSH FIELD.

Thick black heavy oil, unusually high viscosity; gravity 20° B.; flash point 221° F.; burning point 244° F.; sulphur 0.56 per cent. by weight. Composition is:

		By Wt., Per Cent.	By Vol. Per Cent.
Burning oils	302° — 572° F.	13.61	13.64
Paraffines	572° — F.	79.23	77.75
Residue		7.15	

BEAUMONT FIELD.

Clear, free from suspended matter, of medium viscosity, dark brownish black. Sp. grav. 26° B.; flashpoint, 183° F.; burning point, 203° F.; sulphur, 1.41 per cent by weight. Composition is:

		By Wt., Per Cent.	By Vol. Per Cent.
Napthas	.... 302° F.	98	1.11
Burning oils	302° — 572° F.	50.16	52.34
Paraffine	572° — 730° F.	46.42	45.25
...		2.43	....

JENNINGS FIELD.

Dark brownish, black oil; low viscosity; sp. grav., 26.5° B. flashpoint, 161.6° F.; burning point, 197.6° F.; sulphur, 1.04 per cent. by weight. The compesition is:

		By Wt., Per Cent.	By Vol. Per Cent.
Napthas	200° — 302° F.	0.48	0.54
Burning oils	302° — 572° F.	43.87	45.66
Paraffines	572° — 630° F.	46.83	48.83
Residue		7.04	....
Lost		2.24	

INDIAN TERRITORY.

Very dark brown oil; light viscosity; no sediment in suspension; sp. grav., 35.78° B.; flashpoint, 140.9° F.; burning point, 161.6° F.; sulphur, 0.49 per cent. by weight. The composition is:

		By Wt., Per Cent.	By Vol. Per Cent.
Napthas	140° — 302° F.	7.57	9.00
Burning oils	302° — 572° F.	30.19	33.30
Paraffines	572° — 750° F.	55.52	56.40
Residue		4.90	....
Lost		1.92	....

B.T.U. per pound, 17,770; per gal., 125,142.

CADDO FIELD I.

Thin, crude petroleum; brownish-black in thin strata; sp. gr., 38.4° B.; sulphur, 0.52 per cent. by weight; water, none. The composition is:

		By Wt., Per Cent.	By Vol., Per Cent.
Naphthas	200° — 302° F.	0.99	1.11
Burning oils	302° — 572° F.	35.63	36.53
Paraffines	572° — 700° F.	50.31	46.62
Residue		8.19	....
Lost		4.88	....

B.T.U. per pound, 18,992; per gal., 131,691.

CADDO FIELD II.

Sp. gr., 29.5° B.; sulphur, 10 per cent. by weight; water, 1.20 per cent. by vol. The composition is:

		By Wt., Per Cent.	By Vol., Per Cent.
Naphthas	150° — 302° F.	1.72	2.30
Burning oils	302° — 572° F.	21.60	23 48
Paraffines	572° — 730° F.	62.25	64.25
Residue		8.35	....
Loss and water		6.08	....

B.T.U. per pound, 19,356; 141,492 per gal.

The discussion following his paper brought out the fact that Welsh oil was almost impossible to handle, and Mr. Redding stated that the oil from the Ansela Butte field was about the same. The gravity of these two oils, with that from the Breaux Bridge, ran from 17° to 20° B. The oil from the Caddo field, which is almost a pure paraffine oil, apparently gave far better results than from any other.

The average of a number of samples received at Omaha from the Standard Oil Company, Sugar Creek, Mo., were as follows:

Naphthas up to 302°	1.05 per cent.
Burning oil from 302° to 572°	44.90 "
Heavy oil, above 572°	53.10 "
Coke, by weight	0.41 "
Gravity	32.00° B.

In conclusion, will state that oil from each field must be handled differently in the machines. With Kansas oil, at Omaha we get the best oil efficiencies carrying about 1,330° at the base of the superheater, and from 1,250° to 1,300° at the top. Finally, before placing a contract for oil, one must consider the factor of continuous shipments, together with the storage available at the works, so as to keep

(*Continued on page* 26.)

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NOTICE TO ADVERTISERS.

New Advertisements and changes of copy therefor should be in hand Wednesday noon of week prior to date of issue.

NEW YORK, MONDAY, JULY 10, 1911.

[Official Notice.]

Experience Department, Pacific Coast Cas Association.

Pacific Coast Gas Association,
Office of Experience Editor,
San Jose, Cal., June 24, 1911.

To the Members: The Nineteenth Annual Convention of the Pacific Coast Gas Association will be held in Oakland, September 19, 20 and 21. The Experience Editor of the Association is in despair. Cast him a line; come to his rescue, for he needs help. To the notices sent out by the Secretary, few have replied.

We know that every gas man has had at least one experience during the last year that would be of interest to us all. Will you kindly respond at once? We know you are busy; gas men always are. And busy men have many experiences worth telling.

Sincerely yours, John D. Kuster,
48 E. San Antonio street. Experience Editor.

BRIEFLY TOLD.

Ninth Annual General Meeting, the Institution of Gas Engineers.—From the *Journal of Gas Lighting* (dated 20th ult.) we learn that the meeting this year of the Institution of Gas Engineers, which was held in Glasgow, Scotland, June 13, 14 and 15, was in every sense a pronounced success. The meeting place was in the large lecture hall of the Glasgow and West of Scotland Technical College, and the proceedings were ably directed by the President, Mr. Alexander Wilson, Gas Engineer to the Corporation of Glasgow. The attendance was large and representative, the weather propitious, the technical interest was keen and sustained, and the social amenities were fraternal and satisfying. Respecting the attendance, our readers will undoubtedly share in our feeling that the United States was finely represented in the person of Mr. Henry L. Doherty, who, with three companions, is engaged in "tramping" through the British Isles. To Mr. Doherty was accorded the honor of a seat by the side of the President, to be occupied during his attendance at the sessions. The Honors' Men were: The "London" Gold Medal, to Dr. W. B. Davidson, in recognition of his great experimental work, as shown in the paper narrating the "Experiments in Carbonization on the Birmingham Coal Testing Plant. Mr. Jacques Abady (whose recent visit to the States will be pleasantly remembered by many Yankees) received the Silver Medal of the Institution for his paper on "Public Lighting from a Municipal Point of View." And to Mr. Sydney Y. Shoubridge was awarded the Bronze Medal for his description of "The Latest Installation of De Brouwer Stoking Machinery and Coke Handling Plant." President Wilson's magnificent Inaugural Address, and such it was, surely well deserved the hearty vote of thanks for it, as moved by Bailie Paxton, Chairman of the Glasgow Corporation Gas Committee. The Reports of Research Committees, most eloquently and forcefully attest the thoroughness with which such work is carried out by and for the Institution. This year there were three gems in that line; namely, from the Carbonization Committee; the Committee of Gas Heating Research—in connection with the latter we cannot forbear from here quoting the closing paragraph given under the heading in the latter report, entitled, "Examination of Some Burners and Nipples Used in the Present Type of Gas Fires," which is this: "It would be well in low pressure nipples if means were provided in the surface of the nipple—in the form of air inlets—which would allow of the air being drawn in between the gas jets." The third report was an excellent presentation from the Committee on Refractory Materials. The papers read were these: "The Dessau Vertical Retorts at Sunderland," by Mr. Chas. Dru Drury; "The Woodall-Duckham System of Vertical Retorts," by Mr. John P. Leather; "The Scientific Carbonization of Coal," by Mr. J. G. Newbigging; "The Choice of a Carbonizing System," by Mr. P. C. H. Hunt; "The Uses of High Pressure Gas for Industrial Public Lighting," by Mr. S. B. Langlands; "Modernizing a Medium-Sized Gas Undertakihg," by Mr. C. F. Broadhead; "Notes on Corrosion of Service Pipes," by Mr. Jas. M'Leod; "Some Aspects of Gas Supply in a South American City," by Mr. B. F. Browne. The election for officers resulted in these selecions:

Prrsident—Mr. R. G. Shadbolt, Grantham.
First Vice-President—Mr. J. Ferguson, Bell, Derby.
Second Vice-President—Mr. Ed. Allen, Liverpool.
Hon. Secretary - Mr. S. Y. Shoubridge.

The membership lists were thus increased: Elected to Active class, 21; to Associate class, 20. The next place of meeting is London. The nicely arranged outing and entertainment programme contained those pleasing numbers: A luncheon by the corporation; a reception and dance; a visit to the Scottish exhibition; an excursion on the River and Firth, of Clyde—this latter was certainly an elegant function. And, to add a word or two in addition to the closing mention of the sessions by the President, this very summary account "Brings us to the end of a most successful meeting."

Does an Increased Output Show Increased Consumption of Gas for Lighting?—The many papers which have been presented in recent years at association meetings upon commercial subjects have almost invariably contained the admonition that an increased consumption upon an existing installation was a better revenue producer, and a more satisfactory sale, than that of a new consumer. This advice has been based upon the assumption that the gas burning equipment in use was of quite a permanent character, and that it would remain in use whether or not any great efforts were made to enable the consumer to obtain the best results through its use. As an indication of what has been the result in many instances, take a consumer who is using gas for lighting and coal for cooking and water heating. The gas solicitor replaces the fuel equipment with gas. The illuminating engineer of the central station replaces the lighting installation with tungsten lamps, which by-the-way, have been constantly advertised among hosts of readers, and the gas sendout remains the same or perhaps a trifle larger. When the Directors meet to go over the reports it is found that the product has been manufactured and distributed at a lower figure than formerly, and that the sales have increased. But altogether is this a healthy condition?—Lumino.

CURRENT MENTION.

Possibly the proposed sale at auction, in Indianapolis, Ind., of $50,000 of the par value of new common stock in the Citizens Gas Company, of that city, is advertised. The notice of sale further specifies that the stock is of the treasury variety, that the proceeds of the sale are to be used in paying for improvements on the plant, "now underway or already completed." It is still further urged in the notice to possible investors that the Company is arranging to improve its equipment for the recovery of ammonia; "only a portion of the money realized from the sale will be used for the latter purpose, however." It is well, in these times of strenuous competition, with the evil of widespread distrust added thereto, to save the small things,

to the end that greater ones may result. It is also reassuring to note that the astute Directors of the Citizens Gas Company, of Indianapolis, have determined, even at this early day, to follow the safe path of repairing the plant, although in piecemeal way, for to a certainty it must be patent to the least observing that $50,000 will not go a very far way in current repairs to a plant said to be worked and working to its full capacity, that cost several hundred thousands of dollars to construct. This, too, without taking any of the thick slice that must come out of the $50,000 to construct the projected ammonia-recovery plant. To be sure, the shares may bring a premium such as to yield a "vastly larger sum" than the par of $50,000; but, considering the slowness, if not apathy, of the market, respecting exchange of cash for "securities," we believe it fair to assume that par will be a very fine price for the Citizens new issue of shares. In fact, to be perfectly frank about it, we would not give par for the "securities;" no, nor anything like par.

MR. J. E. LENNON, for quite some time Superintendent of the Marlboro (Mass.) plant, has accepted the position of Superintendent of the gas plant operated in connection with the great straw hat factories of Messrs. William Knowlton & Sons, West Upton, Mass.

THE Directors of the Willimantic (Conn.) Gas and Electric Light Company, at their last quarterly meeting, failed to pass on the proposed extensions to the main system. The session was preceded by a dinner served in the Hotel Hooker.

THE Indiana Lighting Company, at the instigation of Manager S. E. Mulholland, has established a conscience fund, having been led thereto by the receipt of two $10 bills that had been mailed in an envelope postmarked "Bluffton." These lines were also inclosed: "This belongs to the old Gas Company that laid the gas line to Fort Wayne years ago."

THE various town clerks of Massachusetts were recently the recipients of a copy of a law passed during the current legislative assembly, that, in essence, declares and specifies that consumers of gas can, upon request, get readings of their gas meters from the agent of the gas company, who, in the usual course of procedure, has just read the meter to determine the requisite monthly statement.

MESSRS. A. J. BOARDMAN, Edward Manrara and "Frank" Bruen have sold their holdings (which are largely in excess of control) in the Tampa (Fla.) Gas Company, to Messrs. John J. Gribbel and David J. Collins, of Philadelphia. Immediately after the transfer the following executive management was named: Directors, John J. Gribbel, David J. Collins and Peter O. Knight; President, John J. Gribbel; Vice-President, D. J. Collins; Secretary, Roscoe Nettles. The new owners, like the thorough business men they have always shown themselves to be, will rebuild on a scale commensurate with the standing and likely speed of the trading growth of Tampa, the planning to further include an extension of mains that figures to at least double the existing mileage. As to the works proper, the go-ahead triumvirate proposes to within a twelvemonth or so construct a plant that will be fully up to furnish gas currents capable of illuminating the houses and keeping in action the kitchens of a center counting a population of 150,000. The probable cost of all these improvements will exceed $300,000—it could easily go to $500,000—which is not at all unnecessary, judging from the rapid growth of the city towards the Ybor section, in which division the Sanchez family—members of the great cigar house of Sanchez, Haya & Co.—are constructing numbers of tenements of the cement-concrete type.

THE authorities of Pierz, Minn., have granted to the projectors of the Pierz Light and Fuel Company a franchise to build and operate a gas plant in the place named.

THE Defiance (O.) *Crescent-News* is our authority for the statement that Mr. J. A. Sloane, of Defiance, has been allowed by the borough Council of Napoleon, O., to lay mains through the streets of that town for the supplying of gas to the residents thereof. It is proposed to pipe the gas from the Defiance works.

THE plant of the Home Gas Company, at Arcadia, Ind., was sold recently at auction by order of the receiver. The property was bought by Mr. A. C. Ayres, of Indianapolis, Ind., at his ultimate bid of $12,000.

"B. L. V.," writing from Media, Pa., under date of the 5th inst., informs us that, towards the close of last month, Judge W. B. Broomell decided that the Merion and Radnor Gas and Electric Company had a right to occupy the streets in Radnor township without the consent of the Township Commissioners.

FROM the annual report of the Public Service Commission, for this District of New York, the figures respecting the operations of the Consolidated Gas Company for the twelvemonth, reveal some interesting figures, showing the magnitude of its operations, and those of some of its subsidiaries. The figures are:

Company.	Operating Revenues.	Surplus.
Consolidated.....	$13,398,597	$10,658,166
New Amsterdam.....	2,708,446	2,594,048
Mutual	1,567,782	1,192,324
Astoria L., H. and P..	3,324,227	905,174
Standard	1,718,959	890,702
Central Union	1,837,790	2,136,707
Northern Union.....	754,373	363,381

At the annual meeting of the Detroit, Mich., City Lighting Commission, Mr. James T. Lynn was elected President of the Commission, succeeding Mr. Geo. B. Sheehey. Mr. Lynn's term as Commissioner expires in 1914. Writing of Mr. Lynn and Detroit recalls the fact that some time ago a certain J. W. Martin, who asked the Detroit City Council to grant him and his associates a franchise to supply natural gas in that city, asserted virtually that Mr. Lynn was one of these associates. These assertions were subsequently publicly denied by Mr. Lynn in the following words: "I have never had the slightest connection nor inclination to be connected with Mr. Martin in this or any other franchise in which he may or might be interested. However, I have had in mind for some time the intention of interesting parties who I know who have a supply of natural gas, to bring it to Detroit; but, in view of Mr. Martin's application, have simply been awaiting the action of the Council."

SOME time ago the Fort Wayne (Ind.) *Sentinel* devoted a goodly portion of an issue to an illustrated description of the "Guldlin Playground," which covers a broad plot of ground, situated not far from the handsome residence of Mr. and Mrs. Olaf N. Guldlin, of Fort Wayne, Ind. This romping ground affords a splendid sward on which a goodly regiment of the youngsters may, without fear of crowding, execute all sorts of manœuvers. When not drilling, the broad fields are plentifully staked with swings, slides, tennis courts, walking courses, ball fields, croquet grounds—in fact, everything that tempts the "young idea" how to train. Necessary shelter is provided, and all is complete for the healthy amusement of the children of Fort Wayne. Of course, all this really beneficent work has resulted from the joint attention of Mr. and Mr. Guldlin, and while the mainstay in the premises is, of course, the first-named, it is equally true that the origin of the idea, and its detailed working out, as well, were with his better half, whose patient persisting, without insisting, whose appealing ways are of wisdom without a show of aggressiveness, and whose successes are achieved withont recourse to any mite of a force that wills from any other source than a heart which actuates a brain constantly alert for bettering the everyday conditions of life as these confront her.

THE Granite City (Mo.) Council has negatived the proposition advanced by the Socialistic Mayor of that place (M. E. Kirkpatrick), to put the gas plant under municipal control.

MR. JNO. A. CLEVELAND has been appointed General Manager of the Saginaw and Bay City (Mich.) Railway Company, of the Bay City Power Company, and of the Bay City Gas Company, which corparations virtually represent all the lighting and traction systems of the named places. Mr. Cleveland has, since 1909, been Manager of the Cobb syndicate Bay City properties, and succeeds Mr. F. T. Hepburn, who will come to New York about July 25th, to join the forces of H. D. Walbridge & Co. Mr. Cleveland graduated from Williams College, Mass., in the Class of 1901, and later on (1904) he completed the Cornell University (N. Y.) electrical engineering course. He is in his 32d year.

THE last week in June, by a vote of 10 to 2, the City Council, of Omaha, Neb., sustained the report of committee in charge of the matter under which the local Gas Company agrees to furnish gas to 1,400 street gas lamps, at the rate of $1 per 1,000 cubic feet. It is also recommended that the contract for furnishing street lamps with equipment, be awarded to Mr. Thomas T. W. Miner, of New York, the Connelly Company to furnish 1,350 street lamp governors.

MR. FRANK R. WILLEY has resigned the post of President-Manager to the United Gas and Electric Company, and of the Louisville and Southern Indiana Traction Company, in order to engage in business in Sacramento, Cal.

THE Buffalo (N. Y.) Gas Company has paid into the city treasury the sum of $141,751.03, on account of special franchise taxes for the years 1907-8-9-10.

PUBLICATIONS.

Lectures on Cooking.—If you live in Chicago you can obtain, for the asking, a complete set of Mrs. Armstrong's latest lectures on cooking with gas; perhaps you can obtain a copy, if not a resident of the "windy city," should you be connected with the gas industry. Write to the Peoples Gas Light and Coke Company for a set, and 'tis quite likely your inquiry will be honored.

(*Continued from page* 23.)

a sufficient stock on hand, in addition to getting the highest efficiency for the least cost.

Discussion.

Mr. Fair—From that paper a small plant would make no mistake in using Connellsville coke, provided the price was right; but, of course, the matter of freight rates is the most important factor in that connection. I would like to ask how gas house coke compares in efficiency with Connellsville, Pocahontas or Solvay? For instance, if you could buy gas house coke for 20 per cent. less than Connellsville coke, would it be good business to do so? I would also like to ask Col. Pratt why he thinks it is advisable for small sets to use the clear gas oil. I think the gentlemen here operating small plants would listen to an explanation of that with considerable profit.

Mr. Warnick—That question is a rather general one to me. I think I would figure out the cost of each coke unloaded; then, after testing I would figure out how much loss of capacity I had, and which of these separate kinds of coke was going to cost me the most in repairs on account of the ash. After I had figured all that out I would be in a better position to tell exactly which was the cheapest thing to use. The loss of capacity directly influences manufacturing labor, and also there is a sulphur and moisture content that must absolutely be considered if a man wants to run economically. We had a peculiar experience at Omaha last year. We thought we were buying the cheapest coke by contract, and suddenly awoke to the fact that the moisture content was so great that it really was very much more expensive than we thought, since it so greatly enlarged our discrepancies. We arrived at that be the use of a moisture determinator. The sulphur content influences your purification cost. It will cost you more for repairs if the ash is detrimental, and also for manufacturing labor if you cannot get the capacity out of it; then the freight rates and the first cost enter into the final argument. I could best answer Col. Pratt's question privately, perhaps, but I may say that by the use of the clear gas oil with a paraffine base the factor of tar is practically eliminated in small sets. With the heavier oils, as a general proposition, unless much intelligence is shown in the operating of the set, tar is more or less detrimental. In taking up this question with gas companies, especially those operating small sets, the argument we use is that clear oil is practically free from tar.

Mr. Vincent—Could Mr. Warnick answer Mr. Fair's question more specifically? Assuming an average gas coke made from Pennsylvania coal from a gas works in this district under average conditions, what is the approximate relative value of that and Solvay coke? Having used both cokes, Mr. Warnick can probably give us an approximate figure therein.

Mr. Warnick—My only experience with gas house coke was some we received from the Denver Gas Company. It costs us $6.20 as compared with $6.40 for Solvay coke. The latter we were able to run on 8-hour cleanings, the ash content averaging about 11 per cent., and we got at least 20 to 25 per cent. more capacity out of it. The other coke showed about 25 to 30 per cent. ash, and we couldn't possibly run it on longer than 5-hour cleanings. Those figures should clearly show which was the more desirable.

Mr. Bertke—The subject of coke for water gas apparatus resolves itself to the percentage of carbon in it. We know the higher the percentage of carbon the fewer pounds per 1,000 it will take to make the gas. Other things of course enter into it. With 20 per cent. less carbon in gas house coke than in the other sort, that 20 per cent. is taken up either by moisture or probably by clinker and ash. Of course the more clinker and ash you have, the more labor required; also, the capacity of the machine will be cut down. I think it is possible for each gas man to find out approximately the percentage of carbon in coke by weighing carefully the coke and ashes for several days. The ashes will probably contain some carbon if you do not pick your clinkers clean, but your result will be approximate. Also, by taking an average sample (say 100 pounds) of coke putting it in a warm place for 24 to 36 hours, or until all the moisture has evaporated, you will approximately obtain the percentage of carbon in the coke.

Mr. Miller—I do not wish to butt in, but Mr. Bertke made a remark which I wish to contest. The percentage of carbon in coke is not the measure of its efficiency for gas making. We had a contract in New Orleans for coke guaranteed 90 per cent. carbon, and after struggling with it for 6 months we asked them to ship us some that ran 85 per cent. carbon, for the reason that the 90 per cent. carbon made clinker that took us ½ to 2 hours to remove, and the loss in such way was more than the increase of 5 per cent in carbon. The 85 per cent. carbon coke clinkered in 30 minutes. Ours were 11-foot machines. In the instance of oil analyses, I fear Mr. Redding has fallen into error, or has been misquoted in regard to the Butte oil—it was a sporadic field which did not amount to much. The well yields great quantities of oil for a short time, and we bought about 25 or 30 cars of it. Analysis showed why we were not getting better results. It carried a large percentage of high temperature paraffine, and gave excellent results in gas making only when high temperatures were carried. The cracking point was very high. The Indian Territory oil, which is high in both benzene and paraffine, if worked out under temperature high enough to crack the paraffines properly, made soot out of the lighter oils; but if your temperature was low enough to make gas of the lighter oils, tar was made out of your heavier products. The chief advantage I have been able to figure respecting gas oils is that the cracking points furnish less variation than the crude oils, which is a decided advantage in operating a small plant. In Algiers, La., where we put up a 5-foot set, after the pipe across the river from New Orleans had been pulled up by a steamship, because in a 4-foot set we couldn't run on crude oil at all. At Dallas, when the Corsicana (Tex.) field came in, yielding a very high grade oil, I put in a 5-foot water gas machine and used the oil very successfully. Then the Beaumont field opened up and oil got so cheap we tried the Beaumont material and found out that, in order to run on that oil, it would be necessary to keep two machiues, because of the general and thorough cleaning obligatory at very frequent intervals on account of the heavy asphalt base in the oils.

Mr. Crawford—As to Mr. Fair's question regarding gas house coke and Solvay coke. In a 4 foot set, that we are operating, we used 45 pounds of Solvay coke per 1,000 as against 60 pounds of gas house coke, employing the same oil. When he figures his freight rate and cost of coke, his results with the two cokes will be quite like ours.

Mr. Bertke—I think the rule that in buying coke, the rule generally holds that the content of carbon should determine which coke you want. There might be instances where the percentage of ash and clinker, even though small, could be of a nature that it would run together, forming hard clinkers sufficient to offset any large percentage of clinker of a softer nature.

Mr. Warnick—In a general way, very often clinker can be put away by the proper use of steam, and many operators lose sight of that fact. I don't say that all clinkers can be done away with by the use of steam, for in some clinker the fusing point is so low that it is almost impossible to handle. By properly tempering the fire much clinkering trouble may be overcome.

Mr. Donelan—As to the buying of light and dark gas oil, there seems to be a difference in freight. I wouid like to find out whether the impurities in the dark gas oil would overcome the difference in the freight rate between the light and dark gas oil.

Mr. Kellogg—I presume we all contract by the year for our coke, I would like to ask the author what percentage of breeze he would stand before making a kick on his contract deliveries, and the same with reference to the percentage of shortage by moisture.

Mr. Warnick—Respecting breeze we have been able to recover less than 2 per cent. and thought we had it practically all. I don't think the breeze content should run over 4 per cent. I don't think I would want to stand for over 4 or 5 per cent. moisture. The shortage would under those conditions be not over 5 or 6 per cent. We might lose 1 per cent. if we didn't take the proper means to recover all the breeze. On the moisture you might lose 4 per cent. if conditions were such to oblige one to store it for 3 or 4 months before firing it, and had considerable warm weather. I think anything in the way of shortages within 5 per cent. a reasonable amount; but when one gets to 10 (in one case we had 18), it looks that something is wrong.

Col. Pratt—Regarding Mr. Donelan's question. An oil below 24° gravity I would consider a fuel oil, which would be shipped at a less freight rate than a higher gravity oil, that is, anything above 28°. The difference in freight rates between what would be termed fuel oil and oil of about 28° would be about 5 cents per 100 pounds at Waverly. Oil of so low a gravity as that which would be termed fuel oil could not be very satisfactory to use in the size of set that I imagine you to have there. It might be reasonably satisfactory in a very large set, but I don't think you could use it with any satisfaction in a small one.

Mr. Donelan—According to the quotation there is a difference of nearly ¼ cent a gallon in freight rate between the two.

The President—Does not Mr. Donelan operate one of the Tenney plants at Waverly?

Mr. Donelan—Yes.

Mr. Grimm—We operate the Tenney process. We buy 32° oil billed at 6.6 pounds a gallon, while those who buy stove oil are billed at 7.1 pounds per gallon. What is the real weight of 32° oil to the gallon?

Col. Pratt—The weight of 6 pounds 6 ounces is the proper weight for 30° to 38° gravity oil. I would say 7.1 pounds is too great a weight for the other grade of oil mentioned, which weight, as I remember it, applies to the fuel oil. It would not apply to a gasoline grade of oil. Stove oil being considered gasoline oil.

Mr. McLean—I have noticed here an analysis of coke, with particu- reference to cokes of the Youghiogheny, gas coke and Solvay types. While having in mind the fact that the paper refers to coke and oils for water gas manufacturing, I think it a probability that an inference would be deduced by many that what might be true of cokes for water gas manufacture would be equally true of cokes for domestic use. For that reason I wish to call attention to some other analysis of gas cokes, and to further call attention to the fact that the by-product cokes mentioned are presumably cokes that have been screened, whereas the gas coke was probably taken from the retort, sent into the yard, and perhaps packed up after it had rained there for some time. In all analysis and tests the first requisite is to get a fair sample, so it is hardly fair to gas coke to take that which has been laying out in the yard, whereas the coke received from the ovens is fresh and, having been sorted and screened, will, of course, show up better. Of course, I don't know how this particular sample was chosen. I would like to add to the analyses given by the author of the paper, two comparisons of Youghiogheny screened gas coke, as against Solvay coke screened in like manner, to note how they stand in that case. The comparative analysis figures are:

SAMPLE NO. I.

	Youghiogheny.	Solvay.
Moisture.....	1.59 per cent.	0.76 per cent.
Volatile matter..	4.45 "	3·37 "
Fixed carbon....	85.27 "	84.52 "
Ash.....	8.69 "	11·35 "

SAMPLE NO. II.

	Youghiogheny. Per Cent.	Solvay. Per Cent.
Moisture.....	1.59	.76
Volatile matter.....	4.45	3.37
Fixed carbon.....	85.27	34.52
Ash.....	8.69	11.35
B. T. U. (calculated).....	13,274	12,975

Since sending to the desk for this paper I made a calculation of the average analyses of Solvay as given by the author to find that the average calorific value of those cokes would be 13,030 B. T. U. per pound, while screened good Yougiogheny coke will yield 13,274 B. T. U. per pound. I think this much due in justice to gas coke.

Mr. Vincent—Does Mr. McLean know where gas house coke can be bought on guaranteed analysis of that kind?

Mr. McLean—Right here.

The President having called for the

REPORT OF COMMITTEE ON A UNIFORM SYSTEM OF ACCOUNTS FOR VERY SMALL GAS COMPANIES.

[Chairman Vincent, of the Committee, read copious extracts from the report and exhibited charts giving a list of accounts offered. And suggested that before the report was published, it should be subjected to careful revision, taking into consideration the discussion which he hoped would be brought out. As the report was to be submitted to the Institute it was decided to continue the Committee they to make any necessary revisions, the revised findings to be submitted to the Institute before same was printed in pamphlet form. The publication of the report, and the discussion on same are, therefore omitted for the present.—EDS.]

Mr. Clabaugh—I think very few of us realize the voluminous work done by this committee, and particularly by Mr. Vincent, and it is certainly in order that it should be recognized by this Association. I, therefore, move that a special vote of thanks be given by standing vote to Mr. Vincent and his associates for the work that they have done.

[Motion duly seconded and carried unanimously.]

The remainder of the afternoon session was taken up in informal discussions of various topics of general interest, including which was a thorough consideration of the report of the Committee on Public Relations. An adjournment was ordered to Thursday morning at 10 o'clock.

THURSDAY, MAY 25.—MORNING SESSION.

The convention was called to or der by the President at 11 A.M., in the cabin of the steamer "W. W.," en route from Clinton to Savannah, on the Mississippi river.

The following paper by Mr. A. W. Borden, of Hastings, Neb., on

GAS HOUSE TERRIERS,

was read by the Secretary:

I do not intend this to be in any sense a treatise upon the handling of men, but will endeavor to very briefly point out a few of the reasons why the ways traveled by a gas superintendent are not always paths of roses.

Most of our small plants are now operating the water gas system as an auxiliary, if indeed it is not the main process, which fact has done much toward solving the labor problem of the retort room. Not that the gas company has more difficulty with its men than anyone else; for, as a matter of fact, I think it will be found that gas company employees are among the highest paid help; but the service rendered by a gas company is of such a nature that frequently a small labor difficulty at the "wrong time" may precipitate a heap of worry for the superintendent.

It is probably true that no two men may be handled in precisely the same manner, and at times the superintendent will find his versatility taxed to the utmost in order to preserve a regular running order of affairs. Regularity is the first principle in the operation of a gas works, and any interruption of the evenness of the operation will cost the gas company good money. If the furnaces are not regularly clinkered the bench heats drop, a low yield of gas and a poor grade of coke being the results, while it follows that the fluctuation in temperature seriously affects the longevity of the settings. If the exhauster governor is neglected it may fail to do its work properly, whereupon either an undue strain of back pressure is cast upon the walls of the retorts, or a vacuum is drawn, causing the furnace gases to be sucked through the walls of the retorts, which has a dire effect upon the candle power. All of these, and countless other things, must be watched.

In a small plant there are many times in the year when the superintendent cannot possibly give the time for more than a cursory daily trip through the works, and some times even that is neglected under the pressure of more urgent demand upon his attentions. If the works is not large enough to boast a general foreman, it will be found necessary to place one of the stokers over the rest of the men. Here is where the stuperintendent will have to exercise his finest judgment, for he has got to select a man intelligent enough to handle his crew to the best advantage, and honest enough not to presume unduly upon the authority vested in him to the end that he fails to do his share of the work. The writer has many times been placed in this position, and since in rural districts it is a difficult matter to secure good stokers, it is very hard to find just the right man for this place. It is agreed that such a man should be sober, honest and industrious, command a fair knowledge of the properties of coal, gas and residuals, and possess that most desirable quality of being able to secure a fairly equal output of work from each member of his crew.

One of the common troubles in a retort house is that a green stoker is often made "sick" of his job in the first week by a shirk system, involving the practice of many a cunning device on the part of the old hands to load him down with more than his share of the work, and if he does not remain long enough to learn the business, he is very apt to drop the work in ignorance of the real reason why it was "too hard."

To know what should be done, and to issue orders to that effect, is one thing; to know just how and when these orders have been executed, or whether carried out at all, is still another.

We have probably all heard the story of the new Irish "Dock Boss', who lined up his husky crew one Monday morning and made the startling announcement that he could lick any one of the bunch; meeting with no response he repeated the assertion in stentorian tones, and added that anyone of them who might feel like disagreeing with him would please step out, whereupon one exceptionally broad-backed young man left the line and approached to Boss; "Pat." sized him up and fixing him with terrible eye and extended finger, ordered thus: "Ye can go to the office and get your time; oi'll have no man in me gang that I can't lick." It is needless to say that it would scarcely do to emulate "Pat's" policy. The gas house terrier is, as a rule, susceptable to the treatment accorded a gentleman. It is my opinion that they will obey rules and orders that are

given without the profane embellishments that detract from the dignity of ones bearing, just as promptly and much more willingly than if otherwise given.

It is a poor policy to display temper with working men, at least in a boisterous way. Preserve your dignity and you not only command a greater degree of respect from your men, but you add to the attractiveness of the job, and it follows that better work will be done by the man who *needs* and *wants* his job. Be firm, avoid argument, go straight to the point, and if you have occasion to discharge a man because of his short comings, do it quietly, not in the hearing of the employees, and that man will usually respect you for the consideration, studiously strive to make your help respect you.

Probably few rules can be used in the successful handling of men, as each calls for an individual sort of treatment. However, one that may be applied very broadly is to insist that harmony be maintained among the employees, since any infraction of this rule cannot but prove expensive to the gas company.

Day in-and-day-out, however, "The Gas House Terrier" is not so terrible, nor so different from other souls, and usually can be handled by convincing him that "the boss" is always fair, has the men's welfare at heart, and is, withal, the best friend they have on earth. The superintendent of a small plant should strive to make the men feel themselves as a well regulated, industrial family, to share the burdens and reap the rewards in peaceful equity, and wherein a disturber will quickly find himself in no position to share etther.

Discussion.

Mr. Blackwell—In our experience with gas house terriers, as the term is generally spoken of, though of the roughest men in your employ, we find that those in our locality—and am sure they are just like the others—all have hearts, and that if approached in the right way one can do as much with them as with any other type of men. You can't convince a gas house terrier, bookkeeper or any other man by calling him all sorts of names. The foreman who uses profane language as a means of forcing his men to do what he wants is sure to have trouble when his back is turned, and I think the right policy to follow with all employees is to at all times treat them as you would want to be treated yourself, if you were in like position. I don't mean you should ask them to dinner with you or take them into your confidence too much, but that you should show appreciation of the work they are doing for you. If everyone in the gas house, or any other place, can work along harmoniously, there will be less trouble than if one seems just looking for a chance to swear about things that certain men are doing. The policy that I try to follow is to always be fair with all the men, especially the laborers. You can generally get along with your foremen and superintendents, but they can't do anything without their men. If you keep in harmony with the laboring man and his work, you will get results; but if the laborers, or the terriers, of whom we are talking, realize you are not in harmony with them, at first chance they will "slip" something over on you if they are in a position to do it. At times things were "slipped" over on us, but there have always been sufficient of the gang to appreciate their and our position, so we always got out of the "hole." If you don't have co-operation on the part of your employees, you may as well shut down your plant or turn it over to somebody else, and the more harmoniously the laborers are treated, the better will they co-operate with the management.

The President—Mr. Weisgerber, I believe, can give us information on this matter.

Mr. Weisgerber—Getting out of college I took a job cleaning fires. After a year they made me foreman, and I got instructions as follows: "There is no use in fighting the men with your fists; hit them with a piece of gas pipe." Getting the ringleaders together we said to them, "We are willing to give a fair day's wage for a fair day's work, but any of you fellows who are looking for a fight should get out." It took some time to convince them of the truth of that statement, but in the manipulation of a gas company by convincing the workmen you are willing to give them a square deal, they will warm to you, even down to the gas house terriers.

Mr. Kellogg—This labor problem is not so bad in the water gas plant as in one of the coal gas type; but I fully agree with the gentlemen who have said it pays to treat your men right. Because you find a man once in a while that is dishonest, mean or crooked, you should not assume they all are that way.

Mr. Roper—You might think it strange that a man in my trade would say anything over those you see fit to call gas house terriers, but I merely want at this time to call to your attention the change in the labor situation. The principal matter to which you have now to give attention is that of "System." The up-to-date manufacturer, regardless of his business, must have system. That is if you have 10 men doing like work, you should know how much each one does every day, paying them according to the energy they put in. The man earning $3 a day, while another in the same gang is only getting $2, shows that former is doing more and better work. In illustration, in our own factory a boy of 20 or so was all right when at work in the factory, but h—l when he got away. Finding we were paying another fellow 25 cents a day more than we were paying him, he asked the superintendent about it. The superintendent showed the two cards, recording just what each man did the day prior. "I will skin him to death," he said, and he doubled his work. He was simply doing what he thought was necessary for the pay he was getting. I am a good deal of a crank on this idea of system. As to this working in harmony, I never visited a gas factory or a plant of any sort where the manager was courteous and pleasant that the office boy or the gas house terrier if you will, was not the same. Where there is mistreatment by an employee I will gamble that the manager is responsible.

Mr. Vincent—I am sorry Mr. Borden was not here to speak to his paper, but I don't believe he could say much more than he did say. It appeals to me as a pretty good paper, and, judging by the discussion, it has been a very good thing for our Association.

On motion a vote of thanks was passed to Mr. Borden.

The President—Mr. Linton's paper was not received, but I believe we could profitably spend a few minutes in discussing its subject, which is

CARE AND MAINTENANCE OF WATER GAS APPARATUS.

Mr. Perry—This is very important, especially in a water gas plant without a coal gas auxiliary. Unless the apparatus is maintained and kept in good order, the gas will likely go out some day when you would rather it did not. I am a strong believer in keeping gas apparatus and machinery in first-class condition at all times. You will find you can make gas cheaper, the labor will be better satisfied; in fact, you won't have half the troubles that you had before. I know that from experience.

Mr. Zahm—Mr. Seamon of the constructing engineer staff of the U. G. I. Company, is on the boat.

The President—We will be glad to hear from Mr. Seamon.

Mr. Seamon—An important item entering into the cost of maintenance of water gas apparatus is that of construction. Attention should be given by the constructing engineer to the end that every detail is placed in the proper manner. If this is not done, of course, your cost of maintenance will naturally increase. I am glad to say that at the present day all water gas manufacturers are very careful regarding the material and workmanship put into their apparatus. In quite a number of years' experiences in constructing water gas apparatus all over the United States, I have seen some very trying troubles due to excessive heats (very common some years ago) on account of improper methods of running. I have been called several times to locations where heats had been so excessive that the checkerbrick in the carburettor were fused from 3 to 4 feet. Once when I entered a certain works I asked the man how long he had been blowing, and his reply was, "18 hours." On asking him whether he had had previous experience in operating water gas sets, he replied he was one of the first that operated a water gas set in a certain city. I told him not to tell anybody that he had had experience, because he certainly hadn't if he had been blowing 18 hours on that set. We took out that brick (where the checkerbrick were laid together I cut three) so fused that they were in one mass; you couldn't see the seams where they were laid. Yet that shows what a water gas set will stand.

Mr. Steinmueller—There isn't much to sry, for everybody here knows how to take care of and maintain water gas apparatus; but the important thing is to understand your apparatus. If you are teaching a man to operate it, have him study it to a certain extent, not simply learn what the instructions prescribe, and stop with that. The apparatus can be kept as clean and in as good condition as any modern electric light plant, and should be so kept. As to maintenance, don't let your checkerbrick run together until it is in such bad shape that your oil results are away down. It is much cheaper to take out the old checkerbrick and put in new ones, or clean the old ones that are not badly slagged or disintegrated. Further, I would advice all to use pyrometers on your machines. If you keep the temperature of your checkerbrick just right, you save oil, the most expensive thing that goes into water gas. Aside from that, take good care of your water gas sets and maintain them the best you know how.

Mr. Vincent—Mr. Steinmueller touched a point that I meant to bring up—it may be one of my "bugs"—but it always seemed to me there is no reason why a gas plant cannot be kept up just as well as an electric one. Going into an electric plant the floor is nicely wiped up, all the machinery is polished and everything is shining; but, walking across the street into the gas plant, you step over a puddle of tar or fall over a bunch of discarded oxide. If there is any brass you can't see it through being covered with dirt. Out to the creek you see the tar oozing away. I wonder if that is not one of the reasons why our labor in the past has been so rough? I once heard a pretty good engineer say he would never spend a cent for polish. I think it is a pretty good investment. I like to see the bright metal work wiped and kept up, and I think you get much better results. In fact, my own experience teaches me that it pays. Get the men interested in keeping up their machinery and they will do it in odd times, or take their own time for it. I believe, if the outside of your machinery is in good shape, it is pretty good indication that the interior is all right. Our gas plants should be kept to the scratch, so we are not ashamed to take a man first to the gas and then to the electric plant.

Mr. Addy—I would like to ask what temperature is thought best at the base of the superheater when a pyrometer is used? Also, are the checkerbrick injured when glazed on the outside? Again, what will be the effect if the brick are black in the center?

Mr. Bertke—The question of temperature depends more or less on local conditions, also on what grade of oil you are using. In our

case we try to find the temperature that will give us the best results. We may not vary more than 20°, but we have in the last few months reduced our temperatures about 50°, and know we are getting better results. We are running at 1,330° on gas oil at the top of the superheater. As to brick, I think it is really a matter of opinion. We always re-checker in detecting the least sign of falling off in point of efficiency. The bricks at carburetter top are usually glazed and covered with a hard deposit. Those we throw away. The bricks not cleaned, regardless of being burned or glazed, go back into the carburetter. I do not think the burning of the brick has anything to do with the efficiency, if the brick substance will hold the heat.

The President—Is there not a very marked increase in the difference between top and bottom temperatures, as the brick become old?

Mr. Bertke—I don't think we have so found.

Mr. Warnick—We are experimenting at Omaha by using the newer brick in the top of the carburetor putting the glazed brick in the top of the superheater, the object being to keep the heats down at the top of the latter, because it will take more heat to heat up the old or glazed brick than the new.

Mr. Perry—There is no doubt that as a brick becomes glazed it takes longer for it to absorb a certain quantity of heat than when new; it also cools off more rapidly. Working along those lines, as Mr. Warnick says, we attempt to keep our old brick in our superheater, where we don't care to have the heat climb up, and by doing so we keep the top heat in the superheater down, and keep the bottom heat about where we wish it. The temperature varies from 1,300° to 1,350°, and we can maintain good results with those heats. If we keep within the limits, both top and bottom, we are satisfied, so that our average heat at the bottom will be about 1,300° and at the top about 1,350° to 1,330°.

Mr. Roper—A given amount of money spent in beautifying a plant is better advertising than a 100 foot electric sign. I have been interested as a member of our Chamber of Commerce in locating a site for one of the largest manufacturing plants in Chicago, employing over 1,000 male employees. They want to pick a site of 25 acres, that will give them an opportunity of beautifying the plant, with the idea that money spent for flowers and gardening around the plant is better advertising than any other they could get. I simply say, as I said before before, that if you find a greasy plant you find a greasy manager.

The President—I am sure Mr. Linton would be greatly pleased to know that the discussion of his paper has been so protracted.

(To be Continued.)

[Prepared for the JOURNAL.]

The Epic of the Gas Stove: Lines in Gas Meter.

By LULU EASTMAN.

The subject that I now, for several days, have had in mind
Is difficult to treat in a prosaic way, I find—
'Tis so suggestive of the *light*, the pleasant things of life,
That every thought of it with poetry seems rife.
In fact, the words flow on in such delightful meter,
Scarce could the poet laureate make any verses sweeter.
But, should my muse all muses of the present age surpass,
No praise to me; she is inspired, she sings the song of gas.
Had gas stoves been invented in Mrs. Shakespeare's time,
Thrice famous William would have been for praising her in rhyme.
It grieves one's heart to turn, through ages past to look,
And see the inconvenient ways that ladies used to cook.
No wonder Mother Eve went out to search for fruit to eat;
It must have been a dreadful task to cook her bread and meat.
It's bad enough to contemplate the way our grandmas did—
Iron kettle swinging from a hook, baked stuffs in ashes hid.
'Tis no surprise to me in stories of the war to read
How girls, disguised in uniform, left home for countries need.
Their motive was two-fold—'most anyone would choose
The smoke of battle to the smoke of stoves they had to use.
And, even at the present day, in many a modern home,
Where all is peace, apparently, war spirits fierce yet roam;
Serene and fair seem all the house, but in the kitchen, look!
With big coal range, on summer's day, a woman tries to cook!
No matter if the mercury marks full ninety in the shade,
The stove must be kept blazing hot, till bread and pies are made.
Perchance her "work has dragged" all day, though faithful she and fleet;
The "fire slow," the "damper wrong," the "oven wouldn't heat,"
Her patience tried till e'en Job's lot would seem an easier part—
Calm though she may be outwardly, war rages in her heart.
And 'tis no comfort, in such plight, to see a neighbor pass,
Cool, smiling, calling as she goes, "Why don't you folks use gas?"
Yes, that's the secret of success in weary woman's ways—
Use gas stoves, bringing nights of ease and long and restful days.
The faults of other kinds of stoves are many and well-known,
Perfection, as a fuel for cooks, belongs to gas alone.
The big iron range, for burning wood or coal, as one may choose,
Is full of ashes, needs more fuel, is seldom right to use;
Both stove and house must heated be to cook one simple dish—
Such waste of heat, to no avail, is not what one would wish.
Some people strive to better things by use of kerosene,
And others choose, most recklessly, explosive gasoline.
The list of failings these stoves have is quite too long to tell;
If other things could be endured, there's still that dreadful smell.
'Tis a relief, just for a change, to let these failures pass,
And contemplate, in a few lines, the advantages of gas.
The gas range is compact, with details all complete;
Takes but small space to stand, is handsome, handy, neat;
The ovens (reservoir) have burners—each its own—
The whole stove may lighted be, or any part alone.
No sending to the grocery store for fuel to make it burn,
No waiting till the oven's hot, no dampers back to turn,
No kindling wet that will not light, no sort of a delay;
Right on the instant heat is had, as quickly put away.
(When a person oversleeps and must get the breakfast quick,
A fire comes very handy, that needs neither coal nor stick),
No ashes, smoke or greasy black to clean from pot or pan,
No explosions—making work for the obituary man;
Safety and economy are in gas stoves combined,
Together with all virtues claimed for every other kind.
Into every home they enter they bring comfort, leisure, peace;
From singing loud their praises those who use them never cease.
Should any doubt still linger regarding what is best,
You need only touch the match. the gas stove "does the rest."

SUGGESTED ILLUSTRATIONS.

In an appendix to this work by the Eastman muse, the authoress suggests that these illustrations, made up from the following spurs to the pictorial Pegasus, will be appropriate:

No. 1.—"Mother Eve," searching in "the Garden" for fruit.
No. 2.—Smoky old stove; disturbed cook—in the background. Battlefield with smoke of musketry, cannons, etc.
No. 3.—Tired, perspiring, woe begone housewife standing in doorway, gasping for breath. *Contra:* Smilingly happy, well dressed housewife tripping by.
No. 4.—Explosion in kitchen, fragmentary sections of stove, dishes and cook "hurtling in space."
No. 5.—Final: Portrait of satisfied housekeeper, flanked by picture of gas range, burnished to the nines.

Advanced Electrical Engineering, Massachusetts Institute of Technology.

The just completed year at the Massachusetts Institute of Technology found the graduate study provided for the department of electrical engineering with an increasing number of students. Prof. Jackson's lectures on the "Organization and Administration of Public Service Companies," were attended by a class of 12 graduate students, and Prof. Pender's lectures, on "Advanced Alternating Currents and the Transmission of Power," were attended by an even larger number of graduate students. Prof. Wickenden's advanced course in the "Design of Central Stations and Distribution Systems," has also been in demand.

Besides graduating the largest class from the undergraduate course which the Institute of Technology has heretofore graduated in electrical engineering, one degree of Doctor of Engineering and four degrees of Master of Science were conferred on men taking their major work in electrical engineering.

Mr. R. L. Jones, who obtained the Degree of Doctor of Engineering, is a graduate from the electrical engineering course of the Massachusetts Institute of Technology, who has followed graduate studies particularly relating to alternating current theory and the transmission of power, electro chemistry, organization and administration of public service companies and mathematics. His research has been on the subject of heat treatment of transformer steel. By using an induction electric furnace he has been able to carry on some interesting and important investigations from which some new results have been discovered which it is believed will be valuable. Mr. Jones has gone into the employ of the Western Electric Company in its division of research and development.

Of the men who received the Master's Degree, Mr. J. P. Hart, a graduate of the United States Naval Academy and of the University of Kansas, goes into the employ of the Southern Pacific Railway at San Fraancisco. Mr. E O. Scriven, a graduate of Beloit College, goes into the employ of the American Telephone and Telegraph Company. Mr. F. B. Silsbee, a graduate of the Institute of Technology, will go to the National Bureau of Standards. Mr. Charles R. Stover, a graduate of Pennsylvania State College, will go to the National Electric Lamp Association at Cleveland, O.

The Master's theses of these four men were respectively, on the subjects of the "Internal Reactance of Steel Rails," "Some Effects High Frequency and the Multigap Lightning Arrester," the "Effect of Frequency on the Permeability of Iron," and the "Reflection of Light from Walls and Ceilings." Mr. Stover's investigation on the last-named topic included an examination of a cubical photometer which produced some very interesting results, not altogeter in line with those hoped for, it may be remarked.

The applicants for permission to become candidates for advanced degrees in electrical engineering are already more numerous than they were last year, and particularly is this true in respect to graduate students who intend to study the problems of electric railroads,

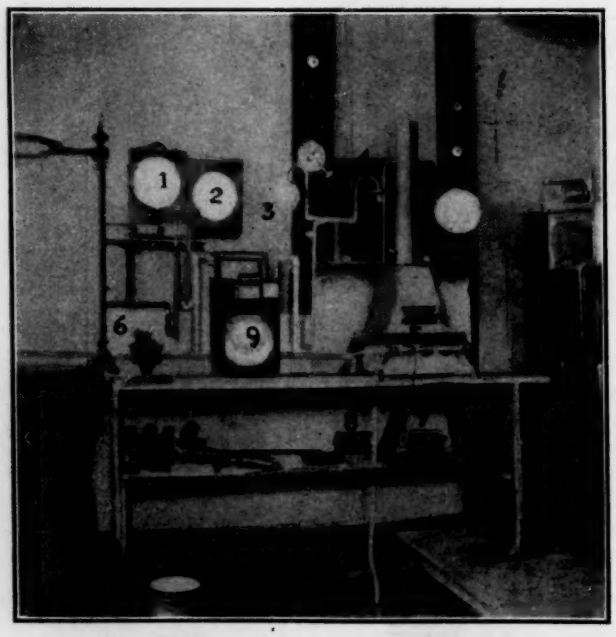
electric transmission of power and the organization and management of public service companies.

The Electrical Engineering Department of the Institute of Technology received an appropriation of $3,000, from the Edison Electric Illuminating Company, of Boston, to be used in an investigation of the relative operating reliability and costs of electric trucks, gasoline trucks and horse trucking, for the purpose of determining to what degree electric trucks are adapted to compete with gas and horse trucks in the city of Boston. This investigation is to cover the cost of delivery of goods in the different ways, and will include all questions concerning electric trucks, noting the influence of the different topics of city pavements on cost of delivering goods, and the effects of different routings of the vehicles. The investigation will be partly theoretical, but it will be planned to determine practically what it ordinarily costs to deliver goods under city conditions. This part of the investigation will be accompanied by actual observations extended over a period of many months. At least a year will be occupied in this work, and Mr. H. F. Thomson has been appointed Research Associate to carry on the work under the direction of Prof. Pender.

Management & Commercial Methods.

A Gas Meter Demonstrating Apparatus.—The City Gas Inspector of Kansas City, Mo., having been appointed under the civil service rules and regulations, has been making a step forward toward helping the consumers of gas in Kansas City, that contains the element of a new idea.

A demonstrating apparatus has been installed in the City Gas and Meter Inspecting Laboratory. It consists of an ordinary gas meter with glass sides and top, so that all the working parts of the same can be seen while in actual operation. To this are connected two ordinary lights, one with and one without a mantle, a small plate burner stove upon which can be placed a contrivance forming a small furnace or heating stove, with smokepipe and gas damper in the pipe. A practical demonstration can be made showing how gas can be consumed economically and efficiently from same, and how it can be burned without giving results, or at a loss.



1. Pressure Recording Gauge.
2. U. Water Gauge.
3. Light with Mantle.
4. Light without Mantle.
5. Plate Burner Stove.
6. Governor Valve.
7. Heat Forming Furnace.
8. Smoke Pipe for Same.
9. Meter with Glass Top and Side.

This office is not allowed either to condemn or recommend any particular device or appliance, but the law states that we should try and show the consumer how to use the same with economy. Natural gas is piped into Kansas City, Mo., from the Kansas and Oklahoma gas fields and furnished to the people through meters at a rate of 25 cents per 1,000 cubic feet. Appliances for using this gas have been placed in all kinds of furnaces, heating and cooking stoves, boilers, etc., also for illuminating purposes. Our experience has taught us that an excessive bill when found is due in almost every instance to the fact that the gas passing through the meter in question had not been used properly.

We feel assured, from past experiences that, aided by a little practical instruction, the device will convince almost anyone who will give the matter some thought and attention will be benefited to some extent. We are operating under the idea that a little help to a party through which he may be able to help himself, will prove the greatest teacher. For this inclosure we are indebted to the courtesy of Mr. Robt. W. Snodgrass, City Gas Inspector.

Items of Interest
FROM VARIOUS LOCALITIES.

Mr. Francis J. Molloy, Mayor of Troy, N. Y., for 3 terms—1894 to 1900—and a Director for 20 years or more in the Troy Gas Company, died in that city, in his 65th year. He was born in Troy, June 26, 1844, and lived there continuously. He was a member of the firm of J. E. Molloy & Co., and Vice-President of the Troy Manufacturers' National Bank.

Mr. J. J. Gordon, who 25 years ago was an important factor in the gas coal trading of this section of the country, through his handling of the coal division of the Cheaspeake and Ohio Railway Company, died at his home in Washington, D. C., the morning of the 25th ult. Mr. Gordon was interested in several gas properties, and if we mistake not, was one of the incorporators of the Bristol (Tenn.) Company, control in which concern was purchased by the H. L. Doherty Company. He was big in body, active in intellect, masterful in control, successful in business, and needful of the duties that he owed to those less fortunate than himself. He was in his 77th year, and is survived by one daughter.

A peculiar resolution that was recently offered in the Alexandria (Va.) Council by Councilman Birrell, the text of which provided for the extension of the mains of the city-owned gas plant, to and through the streets of the adjoining section known as Rosemount; further provided that if the Rosemount Development Company, or any resident of Rosemount opposed annexation of that territory to the coporate limits of Alexandria, the Alexandrians should have the right to discontinue the supplying of gas to such objectors. President Snowden, however, urged the tabling of the ordinance, or resolution, until such time as an opinion from the City Attorney respecti ng the legality of an ordinance of the sort proposed could be obtained.

The Moline (Ills.) Peoples Power Company, the necessary ordinance having been passed by the Borough Trustees, will extend its mains to and through the streets of the outlying district known as Silvis.

Yes, sirs; we said so some months ago—that Manager Searle, of the Rochester (N. Y.) Railway and Light Company, was in no sense neglecting the gas division of that enterpriae. Here's the proof thereof: Within the past 4 months distributing mains to the length of 10 miles, have been put down within the city limits, and within the next 4 months an equal addition will have been made to the system extending beyond such limits.

A correspondent in Haverhill, Mass., writing under date of the 29th June, forwards the following from a recent issue of the *Gazette* of that city: "The price of gas goes down to 85 cents, commencing the 1st of July, which is in accordance with the agreement which the Haverhill Gas Company entered into with the city at the time the agreement was reached, and which the Company stands by despite the city's fight before the State Gas Commission for an 80-cent rate. The matter is now before the State Board partially presented; but the Company lives up to its part of the bargain and will make the reduction regardless of the city's or Commission's action. The rate has been 90 cents, also under the terms of the agreement, and the 5-cent reduction come about automatically, bills from July 1 being figured at the reduced rate. The city has undertaken to have the State Commission repudiate the contract which was made with the Company, and that contest is now being woged, but it is likely to continue until long after the Company goes down to the lowest rate of its own accord. By their official action in petitioning for the 80-cent rate the city has violated its part of the contract, and its attorney declares that the contract was never a legal one anyway, but despite that fact the Company is living up to it, and gas consumers get the 85-cent rate without any order from the Gas Commission in response to the municipal Council's petition."

The first reduction in gas rates, as per agreement between the authorities of Pawtucket, R. I., and the Pawtucket Gas Company, became effective the 1st inst., when the price was put at $1.05 per

1,000, a concession of 5 cents per 1,000. The agreement was made in 1906, when it was arranged that the selling rate (net) should be $1.10 per 1,000, which figure was to go until July 1, 1911. Then automatically the figure of $1.05 was to rule for a period of 5 years, then (1916) the rate goes to $1, where it is to remain until 1921, when a revision is to be in order.

THE contract for the new water gas apparatus that is to be constructed on the plant of the Ithaca (N. Y.) Gas Light Company has been awarded to the Gas Machinery Company, Cleveland, O. Mr. R. S. Stangland, the Ithaca Gas Company's capable Engineer, is not taking any chances with the increased business that is being enjoyed by the Ithaca Company owing to lack of manufacturing apparatus.

"T. F. F.," writing from Springfield, Ills., under date of June 30, incloses the following respecting the determination, by a board of experts, of the differences between the authorities of Taylorsville, Ills., and the Taylorsville Gas and Electric Company, respecting the rate for gas and electric currents that might be charged under its franchise stipulation. The report was received last week by the City Clerk, Mr. J. K. Baumgardner, who did not make it generally public until yesterday. The Board was unanimous in its findings, and the report, which is a lengthy one, is given over largely to an adjustment of the physical value of the Company's property. Briefly stated, 500 cubic feet the month, under the new rate, will cost $1, whereas, under the old cost was $2. Under the new proposition these further charges will accrue: 1,000 cubic feet, $1.87½; old, $2; 3,000 cubic feet, new, $5.37½; old, $5.25. Under this arrangement the small consumer is the one who is benefitted by the rearranged schedule, whereas the larger consumer—3,000 cubic feet and over—will pay a trifle more.; but as the former figures in 85 per cent. of the Company's total output, the Company's net for the present will be reduced. The 25-cent minimum meter rental is also abolished.

THE Rockford (Ills.) Gas Light and Coke Company has permanently retained a demonstratress of the use of gas for cooking, in the person of Miss Caldwell, a graduate in this line of the John Street Institute, of Menominee, Wis. Miss Caldwell's headquarters are in the main office of the Company, from whence she will respond in person to telephone (or other) communication that a gas range is not working as it should, that the hot water heater is not properly on the job, and the like.

MR. LYNN WINTON, well known to the residents of Red Bank, N. J., has attached himself to the inspection staff of the Consolidated Gas Company, of New Jersey, in its Red Bank division.

MR. JAMES THOMPSON has resigned from the service of the Public Service Gas Company, of New Jersey, Camden division, in order to assume the management of the Bellevue Hotel, Cape May, N. J., which well-known hostelry was recently purchased by his father—and no other man is better liked in South Jersey than that self-same father—Mr. John Thompson. The Bellevue is located on the main road from Wildwood to Cape May. Gas men, when in that section, will be sure of a hospitable reception in Mr. Thompson's new quarters.

"F. R. M.," writing from Denver, Col, under recent date, incloses this: "Engineers in the employ of the Denver Gas and Electric Company are visiting steam heating plants in all districts of the States, gathering data which will be used in getting out plans for a new steam heating plant that the Company proposes to install in Denver, next year, at a cost of $500,000, or more. The present works, which were taken over from the Denver Steam Heating Company, about to be consolidated with the Denver Gas Light Company, is certainly not sufficiently up-to-date to supply the demands made upon it. Temporarily it will be repaired to the point of serving in a way during the balance of the year, so it is not likely that actual work in the succeeding plant will be commenced before next spring. Vice-President Barker says it is the purpose of the Company to relay as many of the old mains as possible, between now and September 15th, when the steam heating service is beginning to be called upon, and to lay mains in sections not now piped, but which are likely to come in for heating service when the latter shall be available. The work not completed the current season will be resumed in the spring, and the Company hopes by the fall of 1912 to have the system cover the entire business area of the city so that approximately 10 years must elapse before further extensions are required. Funds for carrying on the improvements to the steam heating service will be provided after the consolidation of all the Doherty companies into the new Denver Gas and Electric Light Company, which will take place July 11, when meetings of the stockholders of the present Gas Company and the Lacombe Electric Company will be held to ratify the merger which was projected last year. The new concern has authorized a bond issue of $25,000,000 of which a large part will be applicable to betterments in the gas, electric lighting and steam heating units of the Company."

THE Hamilton (Pa.) *Journal* of recent date, says that "The concontracts recently let for the building of Huntingdon's new plant which will be one of the finest in the United States, being built after the pattern of the Consolidated Gas Company, of New York city, which is acknowledged by all authorities on the subject, as the greatest in the world." Well! Well!! We knew the Huntingdon plant was to be up-to-date, but we certainly were not prepared to hear it compared with that of the Consolidated. However, there is nothing to be said against thinking well of one's self.

THE plant and every other belonging of the Kenton (O.) Gas and Electric Company were sold at private dicker some days ago to the Hardin-Wyandot Lighting Company. The purchase is returned at $165,000—which would seem sufficient. However, the present owners are proposing to expend not less than $60,000 on reconstruction, the bulk of the expenditure to go to the electric lighting division.

IT is again reported that Col. A. B. Kerlin, of Devil's Lake, N. D., and E. A. Wilson, of Fargo, N. D., have finally arranged for the construction of a producer gas system at Williston, N. D., which is right in the heart of the best lignite deposits of the State.

A LETTER was read some evenings ago by the Council of Totowa borough, N. J., from the office of the Public Utility Commission, of Trenton, N. J., which missive notified the Board that its complaint, in the form of a petition against the Public Service Corporation for its refusal to supply the residents with gas, had been received. The letter stated that no date had yet been set for the hearing, to decide whether the corporation had the right to withhold service from the borough, and that as soon as a date was set the Council would be notified, so that members could attend and show why their request should be granted. If it can be proved that the Corporation would not lose anything by the venture, then the Utility Commission has the power to compel the Corporation to furnish gas to the residents. If, on the other hand, the Public Service Corporation can show that there are not enough people in the borough, desiring gas to warrant the laying of pipes, then the matter can be dropped indefinitely. It is the opinion of the Councilmen that they can satisfactorily prove that the Corporation would get a good return on the investment. A Committee, consisting of Councilmen Wilson, Miller and Dodd, was appointed to attend the hearing. They will get data from the time the attempt was first taken up 4 or 5 years ago, so as to be prepared to answer all questions.

"F. S.," writing from Grand Rapids, Mich., under date of the 1st inst., says: "It is rumored in this district that Mr. B. O. Tippy, Vice-President and General Manager of the Grand Rapids Gas Light Company, has tendered his resignation to the New York, or home offices, of the American Light and Traction Company, in order that he may move to Detroit, there to manage the properties in which he is individually interested. Wherever he goes may good luck go with him."

MR. HECTOR V. LOVING, President of the Louisville Trust Company, has notified the Stockholders' Protective Committee—this body is opposed to the re-election of Mr. Sackett to the Presidency of the Louisville Gas Company—that he will not allow his name to be used as a candidate for election to the Board of Directors of the Gas Company. Mr. Loving has rendered efficient and valuable services to the Company for a number of years, and it is indeed regrettable that he finds it necessary, at this critical juncture, to deprive it of his ever wise practice and counselling.

THE matter of granting the Public Service Corporation, of New Jersey, the right to distribute gas in the district of Madison, which which has been vigorously agitated pro and con for the past year, was finally determined, at a special election, held the last day of June. The matter was of such general interest that a total vote of 607 resulted. Of these, 391 voted in favor of the Public Service proposition; 207 favored the municipal plan, and 9 were rejected. Just prior to the election an ordinance was put on third reading, granting the permission sought by the Public Service, with only the vote of Councilman Whittaker in opposition.

THE proprietors of the Binghamton (N. Y.) Gas Works Company have instituted a new schedule, to become operative forthwith. The net prices under the schedule are:

Less than 5,000 cubic feet	$1.10 net per 1,000
5,000 to 10,000	1.00 " "
10,000 and over	0.90 " "

The present lowest net rate is $1; next high, $1.10; high, $1.25. There is no change in the readiness-to-serve adjustment.

MANAGER BENNETT, in explaining the schedule to a local newsman, very nicely brings out a point that every gas company in the country should flaunt before the legislative authority on every possible occasion. It is this: "Were it not for the large number of customers who use a very small amount of gas, it would have been possible to make even a lower rate for persons who use less than 5,000 cubic feet of gas a month. There are many gas users, however, whose bill will run from 15 to 50 cents a month. They use gas for illuminating purposes only. We have to serve them, inasmuch as they are on our mains, but we actually lose money on all of these accounts. We would rather not serve a customer whose monthly bill averaged less than 75 cents, as that is the limit below which the service actually makes the Company suffer a loss."

The Market for Gas Securities.

There having been no market for city gas shares in the interim, consequently there is no change in the figures quoted as between last Friday and this. To-day, 145 was bid for Consolidated, but the purchasing end thought 145½ was the right thing. Brooklyn Union was also lifeless. In fact, mid-summer dullness is certainly here.

Washington gas broke 450 in the week, selling down to 440, but the trading in it was of the most desultory sort. The regular quarterly dividend of 1 per cent. on the shares of the Massachusetts Gas Companies has been declared, and made payable the 1st prox. The Laclede Company, of St. Louis, has declared its dividend for the 3d quarter of the year (1¾ per cent.) the same being payable September 1st. The reason for this speed is that the proprietors were fearing that it would be better to declare the dividend at the current time of meeting, rather than run the danger of not having a quorum when the regular date would come to hand. Peoples gas, of Chicago, is steady, and in quite some demand.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

115 BROADWAY, NEW YORK CITY.

JULY 10

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked*
Consolidated Gas Co.	$78,177,000	100	145	145¼
Central Union Gas Co.—				
1st 5's, due 1972, J. & J.	3,000,000	1,000	103	105
Equitable Gas Light Co.—				
Con. 5's, due 1932, M. & S.	1,000,000	1,000	115	118
Mutual Gas Co.	3,500,000	100	155	165
New Amsterdam Gas Co.—				
1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	100	101½
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	35	50
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	—	98½	100½
New York and East River—				
1st 5's, due 1944, J. & J.	3,500,000	1,000	103	105
Con. 5's, due 1945, J. & J.	1,500,000	—	95	100
Northern Union—				
1st 5's, due 1927, J. & J.	1,250,000	1,000	94	100
Standard	5,000,000	100	50	70
Preferred	5,000,000	100	70	100
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	103	105
The Brooklyn Union	15,000,000	1,000	142	144
1st Con. 5's, due 1948, M. & N.	15,000,000	—	106¾	107
Yonkers	999,650	500	130	—
Out-of-Town Companies.				
Bay State	50,000,000	50	¾	½
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	—
" 1st Mtg. 5's	500,000	1,000	95	100
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
Bonds, 5's	5,250,000	1,000	50	60
Capital, Sacramento	500,000	50	—	35
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed Gold Bonds	7,660,000	1,000	104	106¼
Cincinnati Gas and Electric Co.	29,500,000	100	92	93
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	96	98
Columbus (O.) Gas Lt. & Heating Co.	1,682,750	100	90¼	91
Preferred	3,026,500	100	75¼	80
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	108½	—
Mortgages, 6's	3,500,000		89	100
Chesapeake, 1st 6's	1,000,000	—	—	—
Equitable, 1st 6's	910,000	—	—	—
Consolidated, 1st 5's	1,490,000	—	—	112
Consolidated Gas Co. of N. J.	1,000,000	100	15	—
Con. Mtg. 5's	976,000	1,000	92	95
Bonds	75,000	—	—	100
Denver Gas and Electric	3,500,000	—	102	105
Detroit City Gas Co.	6,580,000	—	—	50
" Prior Lien 5's	5,619,000	1,000	97	100½
Detroit Gas Co., 5's	381,000	1,000	75	80
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	—	101
Essex and Hudson Gas Co.	6,500,000	—	39	40
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Light Co., 1st Mtg. 5's	1,350,000	1,000	100	101
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	—	112	113½
" Bonds, 5's	10,500,000	—	108	108½
Indianapolis	2,000,000	—	78	88
" Bonds, 5's	2,650,000	—	104½	105
Jackson Gas Co.	250,000	50	82	—
" 1st Mtg. 5's	290,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	—	86
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede Gas Co., St. Louis.	10,000,000	100	108	108½
Preferred	2,500,000	100	94½	102
Bonds	10,000,000	1,000	102½	103
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	143	145
Madison Gas and Electric Co.				
" 1st Mtg. 6's	400,000	1,000	108	108½
Massachusetts Gas Companies, of Boston	25,000,000	100	93½	94
Preferred	25,000,000	100	96	97
Montreal Gas Co., Canada	2,000,000	100	218	218½
Nashville Gas Light Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	56	58
Bonds, 6's	5,000,000	—	137	138
New Haven Gas Co.	2,000,000	25	200	—
Peoples Gas Lt. & Coke Co., Chicago	25,000,000	100	106	106¼
1st Mortgage	20,100,000	1,000	—	—
2d "	2,500,000	1,000	104	—
Rochester Gas & Electric Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104¾	105½
San Francisco Gas Co., Cal.	15,500,000	—	—	—
St. Joseph Gas Co.—				
1st Mtg. 5's	1,000,000	1,000	100	102
St. Paul Gas Light Co.	2,500,000	100	—	—
1st Mortgages, 6's	650,000	1,000	104	108
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	3,447,000	1,000	97	98
Syracuse Gas Co., N. Y.	1,975,000	100	50	55
Bonds	2,047,000	1,000	101	103
Washington (D. C.) Gas Co.	1,800,000	200	445	450
1st Mortgage, 6's	600,000	—	—	—
Western Gas Co., Milwaukee	4,000,000	—	—	—
Wilmington (Del.) Gas Co.	600,000	50	361	—

MEETING TIMES OF THE VARIOUS GAS ASSOCIATIONS.

American Gas Institute.—Annual meeting, October 18, 19, 20, 21, 1911. St. Louis, Mo. Officers: President, Donald McDonald, Louisville, Ky. Secretary, A. B. Beadle, 29 West 39th st., N. Y. City.

Canadian Gas Association.—Annual meeting, ——— Officers President, Arthur Hewitt, Toronto, Ont.; Secretary and Treasurer, John Keilior, Hamilton, Ont.

Empire State Gas and Electric Association.—Annual meeting, Nov., 1911. New York City. Officers: President, M. J. Brayton, Utica, N. Y.; Secretary, C. H. B. Chapin, 29 W. 39th street. New York City.

Guild of Gas Managers of New England.—Annual meeting, March, 1912. Young's Hotel, Boston; monthly meeting, second Saturday. Officers: President, Walter G. Africa, Manchester, N. H.; Secretary, H. K. Morrison, Brockton, Mass.

Illinois Gas Association.—Annual meeting, time, March, 1912, Chicago, Ills. Officers: President, C. B. Strohn, Elgin, Ills.; Secretary-Treasurer, F. E Newberry, Dixon, Ills.

Illuminating Engineering Society.—Annual meeting, Sept. 25, 26, 27, 1911, Chicago, Ills. Meetings of Sections, monthly. Pres't, A. E. Kennelly, Boston, Mass.; Secretary, Preston S Millar, 29 W. 39th street, N. Y. City. Sections: New York, Secretary, Albert J. Marshall, 36 West 39th street. New England, Secretary, W. S. Farrow, 1210 Massachusetts avenue, Cambridge, Mass. Philadelphia, Secretary, S. B. Eichengreen, Broad and Arch streets. Chicago, Secretary, F. H. Bernhard, Marquette Building.

Indiana Gas Association.—Annual meeting, Jan. 17 and 18, 1912, Indianapolis. Officers: President, S. E. Mulholland, Fort Wayne; Vice-President, Howard L. Olds, Indianapolis; Secretary-Treasurer, Philmer Eves. Indianapolis.

Iowa District Gas Association.—Annual meeting, time, May, ——, 1912; Clinton, Ia. Officers: President, G. W. Clabaugh, Omaha, Neb.; Secretary and Treasurer, G. I Vincent, Des Moines, Ia.

Kansas Gas, Water and Electric Light Association.—Annual meeting, time, ——— Wichita, Kas. Officers: President, W. A. Scothorn, Hutchinson, Kas.; Secretary and Treasurer, J. D. Nicholson, Newton, Kas.

Michigan Gas Association—Annual meeting, time, Sept. 20, 21, 22, 1911; Detroit, Mich. Officers: President, A. P. Ewing, Detroit, Mich.; Secretary-Treasurer, Glenn R. Chamberlain, Grand Rapids, Mich.

Missouri Electric Light, Gas, Water Works and Street Railway Association.—Annual meeting, April, 1912; St. Louis, Mo. Officers: President, F. E. Murray, Louisiana, Mo.; Secretary and Treasurer, N. J. Cunningham, Springfield, Mo.

National Commercial Gas Association.—Annual meeting, October 23-28, 1911. Denver, Officers: President, C. N. Stannard, Denver; Secretary, Louis Stotz, 29 West 39th street, New York City.

Natural Gas Association.—Annual meeting, May, 1912, Kansas City, Mo.; Officers: President, A. B. Macbeth, Independence, Kas. Secretary, T. C. Jones, Delaware, O.

New England Gas Association.—Annual meeting, third Wednesday in February, 1912; Boston. Officers: President, J. A. Coffin, Gloucester, Mass.; Secretary-Treasurer, N. W. Gifford, East Boston, Mass.

New Jersey State Gas Association.—President, William H. Pettes, Newark, N. J.; Secretary-Treasurer, Arthur H. Osborn, Belmar, N. J.

Ohio Gas Association—President, John M. Garard, Columbus, O; Secretary-Treasurer T. C. Jones, Delaware, O.

Pacific Coast Gas Association.—Annual meeting, Sept. 20, 21 and 22, 1911, Oakland, Cal. Officers: President, F. A. Leach, Jr., Oakland, Cal.; Vice President, W. Baurhyte, Los Angeles, Cal.; Secretary-Treasurer, John A. Britton, 445 Sutter street, San Francisco, Cal.

Pennsylvania Gas Association.—Annual meeting, April, 1912, Williamsport, Pa. Officers President, C. W. Butterworth, Milton, Pa; Secretary-Treasurer, William H. Merritt, Lebanon, Pa.

Society of Gas Lighting.—Annual meeting, December, 1911; monthly meeting, second Thursday. Place, New York City. Officers: President, Fred. S. Benson; Secretary, George G. Ramsdell, 254 West 89th street, New York city.

Southern Gas Association.—Annual meeting, April, 1912, Jacksonville, Fla. Officers: President, H. B. Hoyt, Jacksonville, Fla.; Secretary-Treasurer, E D. Brewer, Atlanta, Ga.

Southwestern Electrical and Gas Association.—Annual meeting, April 27, 28, 29, 1912; Houston, Tex. Officers: President, J E. Carroll, Beaumont, Tex.; Secretary, D. G. Fisher, Dallas, Tex.

Wisconsin Gas Association.—Annual meeting, May 15 and 16, 1912, Milwaukee, Wis Officers: President, H. M. Buck, Waukesha, Wis.; Secretary-Treasurer, Henry Harmon. Milwaukee, Wis.